TRS-80 SYSTEM 80 VIDEO GENIE PMC-80

Vol 3, Issue 1, December 1981

THE TRS-80 COLOUR COMPUTER REVIEWED

Also in this issue:

ANNUAL INDEX

SOFTWARE:

Level 1 Triangle Solutions
Curvilinear Regression
Polynomial Regression
3-D Maze
Steeplechase
Basic + Labels

MICRO-80

P.O. BOX 213, GOODWOOD, S.A. 5034. AUSTRALIA. TELEPHONE (08) 211 7244. PRICE: AUS. $2.50, N.Z. $4.00, U.K. £1.50

***** ABOUT MICRO-80 *****

EDITOR:	IAN VAGG
ASSOCIATE EDITORS:	
SOFTWARE LEVEL I :	MICHAEL SVENSDOTTER
SOFTWARE LEVEL II:	CHARLIE BARTLETT
HARDWARE :	EDWIN PAAY

MICRO-80 is an international magazine devoted entirely to the Tandy TRS-80 microcomputer and the Dick Smith System 80/Video Genie. It is available at the following prices:

	12 MONTH SUB.	SINGLE COPY
MAGAZINE ONLY	$ 26-00	$ 2-50
CASSETTE PLUS MAGAZINE	$ 65-00	$ 4-00 (cass. only)
DISK PLUS MAGAZINE	$ 125-00	$ 10-00 (disk only)

MICRO-80 is available in the United Kingdom from:
U.K. SUBSCRIPTION DEPT. 24 Woodhill Park, Pembury, Tunbridge Wells, KENT. TN2 4NW

Prices:	MAGAZINE ONLY	£ 16-00	£ 1-50
	CASSETTE PLUS MAGAZINE	£ 43-60	N|A
	DISK PLUS MAGAZINE	£ 75-00	N|A

MICRO-80 is available in New Zealand from:
MICRO PROCESSOR SERVICES, 940A Columbo Street, CHRISTCHURCH 1 N.Z. Ph. 62894

Prices:	MAGAZINE ONLY	NZ$ 43-00	NZ$ 4-00
	CASSETTE PLUS MAGAZINE	NZ$ 89-00	NZ$ 5-00
	DISK PLUS MAGAZINE	NZ$ 175-00	NZ$ 15-00

MICRO-80 is despatched from Australia by airmail to other countries at the following rates:

(12 MONTH SUB.)	MAGAZINE	CASS + MAG	DISK + MAG
PAPUA NEW GUINEA	Aus$ 40-00	Aus$ 83-00	Aus$ 143-00
HONG KONG/SINGAPORE	Aus$ 44-00	Aus$ 88-00	Aus$ 148-00
INDIA/JAPAN	Aus$ 49-00	Aus$ 95-00	Aus$ 155-00
USA/MIDDLE EAST/CANADA	Aus$ 55-00	Aus$ 102-00	Aus$ 162-00

Special bulk purchase rates are also available to computer shops etc. Please use the form in this issue to order your copy or subscription.

The purpose of MICRO-80 is to publish software and other information to help you get the most from your TRS-80, System 80 or Video Genie and their peripherals. MICRO-80 is in no way connected with either the Tandy or Dick Smith organisations.

** WE WILL PAY YOU TO PUBLISH YOUR PROGRAMS **
Most of the information we publish is provided by our readers, to whom we pay royalties. An application form containing full details of how you can use your TRS-80 or System 80 to earn some extra income is included in every issue.

** CONTENT **
Each month we publish at least one applications program in Level I BASIC, one in Level II BASIC and one in DISK BASIC (or disk compatible Level II). We also publish Utility programs in Level II BASIC and Machine Language. At least every second issue has an article on hardware modifications or a constructional article for a useful peripheral. In addition, we run articles on programming techniques both in Assembly Language and BASIC and we print letters to the Editor and new product reviews.

** COPYRIGHT **
All the material published in this magazine is under copyright. That means that you must not copy it, except for your own use. This applies to photocopying the magazine itself or making copies of programs on tape or disk.

** LIABILITY **
The programs and other articles in MICRO-80 are published in good faith and we do our utmost to ensure that they function as described. However, no liability can be accepted for the failure of any program or other article to function satisfactorily or for any consequential damages arising from their use for any purpose whatsoever.

***** CONTENTS *****

	PAGE
EDITORIAL	2
REVIEW OF THE TRS-80 COLOUR COMPUTER	3
INDEX TO MICRO-80 - DECEMBER 1980 TO NOVEMBER 1981	6
A WORD FROM THE SOFTWARE EDITOR	9
SOFTWARE SECTION	
TRIANGLE SOLUTIONS.....L1/4K	9
3-D MAZE.....L2/16K	13
BASIC + LABELS.....DISK/16-48K	22
POLYNOMIAL REGRESSION ANALYSIS.....L2/16K	26
CURVILINEAR REGRESSION ANALYSIS.....L2/16K	28
STEEPLE CHASE.....L2/16K	30
MICRO-80 PRODUCTS	17
NEXT MONTH'S ISSUE	35
CASSETTE/DISK EDITION INDEX	36
ORDER FORM	36

MICRO-80 is registered by Australia Post - Publication SQB 2207 Category B

AUSTRALIAN OFFICE AND EDITOR:

MICRO-80, P.O. BOX 213, GOODWOOD, SOUTH AUSTRALIA, 5034. TEL. (08) 211 7244

U.K. SUBSCRIPTION DEPT:

24 WOODHILL PARK, PEMBURY, TUNBRIDGE WELLS, KENT TN2 4NW.

Printed by:

Shovel & Bull Printers, 312A Unley Road, HYDE PARK, S.A. 5061.

Published in Australia by MICRO-80, 433 Morphett Street, ADELAIDE.

***** SPECIAL OFFER TO NEW READERS AND READERS RENEWING THEIR SUBSCRIPTION *****
***** SOFTWARE LIBRARY, VALUED AT OVER $100 – FREE ! ! ! *****

MICRO–80 has developed a new Library of Software consisting of 7 programs and a comprehensive user manual. The Software Library, on cassette, will be sent FREE to every new subscriber and to every subscriber who renews his subscription for another 12 months. Disk subscribers will receive their Software Library on a diskette. The new Software Library contains the following Level II/Disk Programs. All programs will also operate on the Model III.

Level I in Level II
Convert your Level II TRS–80 or System 80 to operate as a Level I machine. Opens a whole new library of software for your use.

Copier
Copies Level II System tapes, irrespective of where they load in memory. Copes with multiple ORG programs.

Z80 MOM
A low memory, machine language monitor which enables you to insert OP codes, edit memory, punch system tapes etc..

Cube
An ingenious representation of the popular Rubicks cube game for Disk users.

Poker
Play poker against your computer, complete with realistic graphics.

Improved Household Accounts
Version 3.0 of this useful program. One or two bugs removed and easier data entry. This program is powerful enough to be used by a small business.

80 Composer
A music generating program which enables you to play music via your cassette cord and to save the music data to tape. This is an improved version of the program published in Issue 17 of Micro-80.

***** EDITORIAL *****

This issue heralds the commencement of MICRO-80's third year of publication. In the past two years we have changed a lot and so have our readers and their interests. Two years ago, the TRS-80 was still fairly new in Australia and the System 80/Video Genie had been well heralded but had failed to materialise. The majority of TRS-80 owners used L2/16K cassette-based systems with a sizeable minority using L1/4K systems. Disk-based systems were a comparative rarity. In the U.K. the TRS-80 was far behind the Commodore PET in popularity and there were probably not many more owners of TRS-80's in the whole of the U.K. than in Australia.

Now, two years later, we find a very different story. In Australia, owners of Level 1/4K TRS-80's are in a small minority, L2/16K cassette-based systems are probably still in the majority but a very large proportion of readers now use systems having one or more disk drives. The System 80/Video Genie has arrived and many thousands have been bought by enthusiastic newcomers to microcomputing. The Model III TRS-80 is growing in popularity although its owners still represent a fairly small minority of TRS-80 users. In the U.K., the Video Genie has proven very popular indeed and may have exceeded the TRS-80 in sales. The Model III TRS-80 too, is reportedly proving very popular.

The effect of all this on MICRO-80 is that those readers who have been with us for two years now have a great deal of experience and expertise and are looking for more advanced articles and programs, particularly for disk systems. Those new readers who have only just acquired their systems are looking to us to support them with elementary articles, hints and tips etc. Some System 80/Video Genie owners feel that we treat them as second class citizens; some Model III owners feel that we completely ignore them. Everyone is unhappy about our late production of the magazine. So, what are we going to do to meet the challenges of the next 12 months and make sure that we satisfy the needs of all our readers? The answer is, a great deal. Over the next few months we will be introducing a number of different departments into MICRO-80 to cater for the different interests of our readers. There will be a department devoted to disk users and another devoted to the Model III. We do not intend to differentiate between the TRS-80 Model I and the System 80/Video Genie, however, because despite minor differences, these are essentially the same system. Later in the year, we will be adding a Colour Computer Department which will cater for the recently released TRS-80 Colour Computer and the Hitachi Peach, both of which use the 6809 microprocessor and MICROSOFT BASIC interpreter. As an earnest of our intentions, we have put a considerable amount of effort into developing the new software library to be sent free to every new subscriber and every reader who renews his subscription (from this issue on). The programs in this library run on the TRS-80 Models I and III, the System 80/Video Genie and disk systems as well as cassette systems. Some of the utilities in this library are not available for the Model III for instance, at any price.

ENCHANCEMENTS TO THE MODEL II.

Recently, an enhanced version of the TRS-80 Model II microcomputer was announced in the U.S.A. Known as the Model 16, this machine incorporates a 16 bit CPU board using the Motorola 68000 chip , in addition to the standard Z80A CPU of the Model II. For just under $6000 US. Americans will be able to purchase the model 16 with 128K of RAM expandable at additional cost up to 516K. A 10 megabyte hard disk has also been announced for this machine and it is possible to connect two dumb terminals to it. Existing owners of Model II machines will be able to purchase an upgrade kit consisting of the 68000 CPU board which plugs directly into one of the vacant sockets inside the cabinet.

Based on our own experiences with the Model II, we are becoming more and more convinced that this is one of the most underrated business machines available today. We know of several salesmen working for specialist word processing organisations who privately admit that the Model II with Scripsit is superior to their own machines at about half the price! The Model 16 is sure to be an even more formidable contender than the Model II. Anyone who is considering spending $6000 - $12000 on a business computer could do much worse than purchase a Model II.

RUMOUR-SQUASHING DEPARTMENT.

For some time now, there have been persistent rumours that Tandy has dropped the expansion interface for the Model I from the Australian market. We checked this out with Mal Williams - Computer Marketing Manager at Tandy. Mal was adamant that this is not so. Indeed, at the time we called him, he was in the process of ordering more from the U.S.A. What has been dropped is the L1/4K TRS-80 Model I.

LOWER-CASE IN NEW TRS-80 MODEL I.

The TRS-80 Model I has recently undergone a minor redesign. The main reason was that the 21L02A IC's used as video RAM have become obsolete and are no longer manufactured. Instead, they have been replaced with two 2114 IC's. The significance of this is that the 2114 is arranged as 1K by 4 bits so the two chips give a video RAM of 1K by 8 bits whereas previously, the machine had only 1K by 7 bits as standard. An important part of any lower-case modification was the addition of an extra 21L02A video RAM chip to increase the video RAM to 1K by 8 bits. This modification is no longer necessary to obtain lower-case. A further rationalization carried out has been to drop the earlier character generator and use only the more recent one which contains proper lower-case characters. If you have one of these recent machines, all you need do to obtain correct lower-case characters in BASIC, is to load a machine language lower-case driver routine such as that published on page 29, Issue 18 of MICRO-80. A word processor program such as SCRIPSIT will automatically enable the lower-case.

CONTINUED ON PAGE 8

***** REVIEW OF THE TRS-80 COLOUR COMPUTER *****

The major part of this review was written by Rob Glanville of Victoria who imported his own Colour Computer from the U.S.A. some time ago. Rob previously used a TRS-80 Model I and is an avid games enthusiast. Before handing over to Rob, we will record our own impressions of the Colour Computer and, more importantly, its position relative to other computers which are available.

The TRS-80 Colour Computer is a TRS-80 in name and livery only. In all other respects it is completely different from the other computers which share the name TRS-80. No attempt has been made to provide compatibility or program interchange with the Model I or Model III. Why has Tandy taken this approach?

Tandy did not tell us (to be fair, we didn't ask the question in those terms) but it is not too difficult to work out. There has been a lot of requests for high resolution colour graphics from Model I and III owners but the hardware and memory mapping of this machine preclude a simple, economical solution to the problem. Equally, many people have been buying video games machines which have become more and more intelligent, culminating in the Atari 400 and 800 microcomputers. Tandy has obviously seen an opportunity to enter a new market - the super-intelligent video games machine. Model I and Model III owners will have to make a choice. Do they want to stay with their more powerful (in computing terms) more expandable systems and put up with low resolution monochrome graphics, or would they prefer the high resolution colour graphics display of the Colour Computer, knowing that it will never be capable of all the serious uses to which the Model I/Model III can be put.

The latter is an important point. In our opinion, the Colour Computer will never be seriously used as a word processor for example, or for any application requiring the input of large amounts of data. The keyboard is too much like a calculator for the former and there is no numeric keypad available or projected. Add to that a display of 16 lines of only 32 characters each and lower-case indicated by upper-case letters with colours reversed, and you will understand why we say what we do. Nor does Tandy suggest that the Colour Computer should be used in business-type applications. They have the Models II and III for that.

So, the choice is yours, if you want a true home computer which will be lots of fun for the family (it has to be because whilst you are using it the colour T.V. is tied up!) using packaged software, but which will allow you to write your own programs and learn programming in BASIC, then the Colour Computer could be just right for you. On the other hand, if you are the type who frowns on the use of computers for playing games (and many do) or who would like to use your computer as a word processor or for stock control, etc. etc., then you would be better off opting for a Model II or III as far as the Tandy range is concerned.

Now, over to Rob for some more details of the Colour Computer.

The keyboard unit of the TRS-80 Colour Computer measures 375mm long x 350mm deep. The keys are of a plastic calculator type coloured grey, control keys are white and break key is red. The keyboard unit is coloured 'Tandy' silver. The computer is quite light, apparently 80% less IC's are used, compared with the Model I. At the right side of the unit is the cartridge slot for use with Tandy's 'Program Paks'. The back of the computer has reset button, AC cord, channel selector, video output (RF Modulated), cassette jack, RS232 serial Interface, 2 joystick jacks and power switch.

The basic Colour Computer comes with one (1) programming manual, but if Extended Basic is installed, two (2) manuals are included. Both manuals are lighthearted, entertaining and most importantly teach you about this quite different TRS-80. Plenty of do-it-yourself type exercises and sample programs are provided to show this machine's capabilities.

On power up the screen clears to the default colour of green and message below appears:

```
EXTENDED COLOR BASIC 1.0

COPYRIGHT (C) 1980 BY TANDY

UNDER LICENSE FROM MICROSOFT

OK
```

The cursor is constantly cycling through the nine (9) colours, which are black, green, yellow, blue, red, buff, cyan, magenta and orange. The unit powers up in 'caps lock' position. Type shift Ø and typewriter style operation is obtained. Lower case letters are displayed as inverse capitals, i.e. green letters on black background. The display is 32 characters per row x 16 columns. This makes text easy to read.

The standard unit has 8K of Read Only Memory (ROM) which is quite useful, but Extended Color Basic, which is an additional 8K ROM circuit, makes this computer much more flexible and easy to use with Simple Basic statements. Standard Color Basic has 'set' graphics of 64 x 32 resolution.

Higher resolution graphics are obtainable, but could prove confusing to the first time user.

Graphics Extended Basic Only:

There are several PMODEs (degrees of resolution) to choose from. These are:

PMODE 0	128 x 96	Two Colours	1 page
1	128 x 96	Four Colours	2 pages
2	128 x 192	Two Colours	2 pages
3	128 x 192	Four Colours	4 pages
4	256 x 192	Two Colours	4 pages

Colour sets available are:

PMODE#	SCREEN	TWO COLOUR	FOUR COLOUR
4	0	Black/Green	-
	1	Black/buff	-
3	0		Green, Yellow, Blue, Red Buff, Cyan, Magenta, Orange.
2	0	Black/Green	
	1	Black/Buff	
1	0		Green, Yellow, Blue Red.
	1		Buff, Cyan, Magenta, Orange.
0	0	Black/Green	
	1	Black/Buff	

RAM for graphics is allocated by the PCLEAR N statement. N is number of pages to be cleared. Each page is 1536 bytes. All graphics are plotted on a 256 x 192 pixel matric. Example:-

```
10  PCLEAR  4 : ' Clear 4 pages of RAM.
20  PCLS      : ' Clear graphic pages to background colour.
30  PMODE 3,1 : ' Select resolution required.
40  SCREEN 1,0: ' 1 Selects graphic screen, 0 selects colour set.
50  PSET (128,96,2) : ' Sets 1 pixel at centre of the screen, yellow in colour.
60  GOTO 60   : ' Loop forever.
```

The command PRESET turns off pixels which were previouslyu PSET.

LINE : Draws a line from (X1, Y1) - (X2, Y2), PSET.

Example:-

Line (Ø,Ø) - (225,191), PSET would draw a line from top left corner of screen to bottom right corner. This statement could also include 'B' to draw a box and/or 'F' to fill the box with colour.

CIRCLE : Syntax is (X, Y),r, c, hw, start, end.

X,Y is co-ordinate for centre of circle.

r specifies radius of circle.

c Specifies colour (dependent on colour set chosen).

hw Specifies height/width ratio - numeric from 1 to 255.

Start Specifies start point of circle, 0 - 1.

End Specifies end point of circle, 0 - 1.

DRAW : "String".

Motion Commands:

M Move draw position.

U Up.

D Down.

L Left.

R Right.

E 45° Angle.

F 135° Angle.

G 225° Angle.

DRAW : "String" continued..

Motion Commands:

H 315° Angle.

X Execute a substring and return.

Modes:

C Colour.

A Angle.

S Scale.

Options:

N No update of draw position.

B Blank. Used to prefix Move, also for blank lines.

Example:

```
DRAW "BMØ,Ø; R255;D191;L255;U191".
```

This would DRAW a line starting at top left corner, continuing around screen border.

NOTE - Since text characters cannot be shown on the graphics screen, the DRAW command can be used to DRAW the text.

Substrings can be executed as follows:

```
10    PMODE 3,1
20    PCLS
30    PCLS
40    A$ = "BM128,96;U25;R25;D25;L25".
50    DRAW "BM95,50;U25;XA$;D25;L25".
60    GOTO 60.
```

All substrings must be prefixed with X. The semi colon after the xy start point is compulsory, while semi colons separating movement commands are optional, but usually included for legibility.

GET/PUT:

This is the fastest way to move things around on the graphics screen. It works like this:

1st. Define area required as an array (maximum 1,400 elements).
2nd. DRAW (or otherwise) your shape to be moved.
3rd. GET (label) the area of memory (screen location).
4th. Clear graphics screen or draw blanks.
5th. Put the array back on the screen in destination stated.

EXAMPLE:

```
10    PCLEAR 4
20    PMODE 3,1
30    PCLS
40    SCREEN 1, 1
50    DIM V (20, 20): Dimension array for use.
60    CIRCLE(20, 20), 10
70    GET (10, 10) - (30, 30), V:' Label array with area of screen.
80    PCLS
90    FOR PAUSE = 1 to 300 : NEXT PAUSE.
100   PUT (110, 110) - (130, 130), V:' PUT circle elsewhere.
110   FOR PAUSE = 1 to 300 : NEXT PAUSE.
120   GOTO 120 :' loop forever.
```

This program DRAWs a circle at position 10, 10 then clears the screen and PUTs the circle back at position 110, 110.

PLAY:

Forget machine language subroutines and POKEing sounds, durations etc. Now you can PLAY all sorts of notes and sounds. PLAY notes from A-G over 5 octaves including flats and sharps. Length of notes can vary from 1 which is a whole note up to 1/255th of a note. Tempo can be set from 1 up to 255. Volume is software selectable with 30 levels. Rests are available with durations same as length of notes. Substrings can be executed as in DRAW.

Back to more mundane commands. RENUM is functionally the same as the utility program available

CONTINUED ON PAGE 8

***** INDEX ..... DECEMBER 1980 TO NOVEMBER 1981 INCLUSIVE *****

SOFTWARE			PAGE
ACTIVE FILTER	L2/16K	Dec 80	23
ADVENTURE IN MURGLE	L1/4K	Apr 81	11
AGEING RELATIVELY	L2/4K	Mar 81	16
ALPHABETICAL LISTING	L1/4K	Dec 80	21
ARITHMETIC	L1/4K	May 81	7
ASTRONOMY 1.0	L2/16K	Feb 81	21
+ microbug		Oct 81	14
ATOMIC TABLES	L2/16K	Nov 81	23
ATTACK	DB/L2/16K	Nov 81	13
AUTOMATIC CHESS BOARD	L2/16K	Jan 81	14
BASIC ARRAY SAVER/ LOADER	L2/4K	Sep 81	25
BASIC LINE REF. VALIDATOR	L2/4K	Nov 81	15
BASIC MEMORY DUMPER	L2/4K	Mar 81	11
BIG LETTERS	L2/16K	Aug 81	21
BINARY CONVERTER	L2/4K	Aug 81	4
BIRTHDAY	L1/4K	Aug 81	13
BINGO	L2/4K	July 81	26
BLOWFLY	L2/4K	July 81	14
BONES	L2/4K	May 81	23
BOWLING	L2/4K	Mar 81	26
BREAKOUT	L1/4K	June 81	14
CELLAR CONTROL	L2/16K	Jan 81	21
CHEQUE BOOK DATA FILE	L1/4K	July 81	12
CHESS BOARD (AUTOMATIC)	L2/16K	Jan 81	14
CHORD PRACTICE	L2/4K	June 81	25
80-COMPOSER	L2/16K	Apr 81	24
+ microbug		July 81	9
CONVERSIONS (metric)	L2/4K	July 81	22
COSMIC WARS	DB/32K	Aug 81	27
COPYCAST	L2/16K	Mar 81	13
CWORD	L2/4K	Jan 81	13
DISASSEMBLER	L2/16K	May 81	11
DISK INDEX	DB/16K	July 81	32
+ microbug			
DOG RACE	L2/4K	June 81	27
FINANCE	L1/4K	Mar 81	21
+ microbug		May 81	2
FRUSTRATION	L1/4K	Apr 81	13
GRAND PRIX	L2/16K	Apr 81	22
GRAPHIC UTILITY	L2/m.l.	Dec 80	31
GENIUS	L2/16K	July 81	27
GUZINTA	L1/4K	Aug 81	11
INPUT CHECKING (Better Basic 3)	L2	July 81	5
INTERCEPT	L1/4K	June 81	16
JOYSTICK SOFTWARE DRIVERS	L2	Nov 81	3
KEYNOTE	L1/4K	Feb 81	12
LIFE AT 7000H	L2	Jan 81	23
LINEAR REGRESSION	L2/4K	Aug 81	15
LINE INPUT FOR L2 (Better Basic 3)	L2	July 81	5
LIST DISABLE	L2/4K	June 81	28
LOWER CASE DRIVER FOR E.S.F.		Sep 81	28
MATURITY TEST	L1/4K	Jan 81	11
(METRIC) CONVERSIONS	L2/4K	July 81	22
METRIC TIME	L2/4K	Apr 81	23
MICROHEX	L2/4K	Feb 81	15
MILEAGE CALCULATOR	L2/4K	July 81	15
MORSE CODE DECODER	L2/4K	Oct 81	34
MOVIE	m.l.	Sep 81	23
MUGWUMP	L2/4K	Dec 80	15
MULTIPLE REGRESSION ANALYSIS	L2/16K	Nov 81	21
MURDER	L2/16K	Feb 81	31
NORMAL DISTRIBUTION	L2/16K	May 81	10
PAYROLL	L2/16K	Apr 81	29
PHILATELIC ADVISER	L2/16K	May 81	24
PINBALL	L1/4K	Feb 80	9
POKER	L2/16K	Oct 81	24
PRIME GENERATOR	m.l.	June 81	21
PSYCHIC MASTER	L2/16K	June 81	33
PUT	m.l./4K	Oct 81	21
REMOVING LINEAR BRACKETS	L1/4K	Mar 81	22
+ microbug		May 81	2
ROVING TARGETS	L1/4K	Sep 81	11
SEA WOLF	L2/4K	Feb 81	16
+ microbug		Mar 81	10
SEMAPHORE	L2/4K	Sep 81	14
SETTING NON-GRAPHIC CHARACTERS	L2	Apr 81	15
SHARE CHARTING	L2/16K	June 81	29
SHARE GRAPH	L1/4K	July 81	11
SHARE TRANSACTION COSTS	L2/4K	June 81	29
SHIFT LOCK	m.l./16K	Oct 81	29
SHOOTING GALLERY	L1/4K	Jan 81	9
SHORTEN	m.l/32K/DB	Oct 81	22
SOLITAIRE	L2/16K	Sep 81	13
SORTING	L1/4K	May 81	9
SORT/MERGE (BUBBLE)	L2	Nov 81	8
SOUND EFFECTS REVISITED (OR $TRING$ & THING$)	L2/16K	Sep 81	29
STAR SHOOT	L2/4K	July 81	24
SUPER SIZZLER MICROBUG	-	Oct 81	14
SYSMON (BMON + SYSCOPY)	-	Mar 81	5
TABLES TESTER	L2/4K	Mar 81	24
TBUG UPDATE	L2/m.l.	Feb 81	14
TENNIS	L2/4K/m.l.	Jan 81	28
TEXT TYPER	L2/16K	Nov 81	24
THREE BILLY GOATS GRUFF	L2/16K	Sep 81	16
TIC-TAC-TOE	L1/16K	Nov 81	10
TOWERS OF HANOI	L2/16K	Nov 81	31
TWELVE HOUR CLOCK	L2/4K/m.l.	May 81	22
UNIVERSAL LOWER CASE DRIVER ROUTINES		May 81	29
UTIL 1 : 2 : 3 : 4	L2/m.l.	Aug 81	28
+ microbug		Oct 81	14
VARIABLES WORKSHEET	L2/16K	Apr 81	16
VICTORY AT BATHURST	L2/16K	Mar 81	27
+ microbug		May 81	2
WELL CLIMBER	L2/4K	Dec 80	23
WORLD TIME	L2/16K	Dec 80	27

HARDWARE		
Mod. for System 80 cassette	June 81	11
Using TRS80 sound programs on a System 80	June 81	13
Joysticks and I/O ports - Part 1	July 81	7
Joysticks and I/O ports - Part 2	Aug 81	7
Joysticks and I/O ports - Part 3	Oct 81	8
Joysticks and I/O ports - Part 4 (software drivers)	Nov 81	3

BETTER BASIC PROGRAMMING

		PAGE
Part 1 Strings	May 81	3
Part 2 Arrays	June 81	2
+ microbug	July 81	9
Part 3 Checking input	July 81	3
Part 4 Screen formatting	Aug 81	5
Part 5 Assembly	Sep 81	3
Part 6 More assembly/BASIC	Oct 81	3

E.S.F. FORUM

Care, cleaning and crashes	Feb 81	6
Recovery of damaged wafers	Feb 81	7
Hardware hints	June 81	8
Parameters for saving m.l. to wafer	June 81	8

EVALUATIONS AND REVIEWS - Hardware

80-Grafix from Programma Int.	Dec 80	9
Dick Smith "Sound Off" kit	Dec 80	14
Escon Selectric conversion + TASP	Jan 81	3
Escon Selectric conversion + SCRIPSIT	Jan 81	4
TRS-80 Model III	Feb 81	2
Upper/lower case for Sys80/PMC/V.G.	Apr 81	10

EVALUATIONS AND REVIEWS - Software

Microsoft Editor/Assembler Plus	Dec 80	11
'Count' Adventure	Dec 80	14
TASP Word processor (with Escon)	Jan 81	3
Simutek One	Mar 81	3
Dunjonquest	Mar 81	4
Percom OS.80 Disk Operating System	Mar 81	7
Programs for Primary Schools (Number matcher, Maths exerciser & spelling test)	Apr 81	3
Toolkit	Apr 81	4
Zchess	Apr 81	5
Xedit	Apr 81	7
Scripsit word processor	Apr 81	9

MICROBUGS

Mighty Mormar bugs	Dec 80	12
Syscopy/BMON Clashes	Dec 80	12
More about Sysmon	Mar 81	5
System 80 program alterations	Jan 81	7
- Sound effects (July 80)	Jan 81	7
- Keyboard bleeper (Nov 80)	Jan 81	7
- Draw 2	Jan 81	7
- Sound program (July 80)	Jan 81	7
KBFIX line missing	Feb 81	7,8
Sea Wolf - program line Ø	Mar 81	10
Financing	May 81	2
Removing linear brackets	May 81	2
Victory at Bathurst	May 81	2
80-Composer	July 81	9
Better Basic programming - Part 2	July 81	9
Super sizzler	Oct 81	14
Astronomy	Oct 81	14
Util 1 : 2 : 3 : 4	Oct 81	14

INPUT/OUTPUT (Letters to the Editor)

Level 1 + Level 2 mod. with 2 chips	Dec 80	7
Loading m.l. programs from tape into System 80	Dec 80	7
Talking your programs in	Dec 80	7
Mods. to System 80 problems	Dec 80	8
CTR.41 speeding up	Dec 80	8
Accepting programs on E.S.F wafers	Feb 81	7
E.S.F. compatible with Tandy disk drives	Feb 81	7
Hardware mod. for System 80 cassette	June 81	11
String "garbage collection" routine	Aug 81	7
Computer aided design	Oct 81	15
Cassette waveform improvement	Oct 81	16
Educational uses of the '80	Oct 81	16

MISCELLANEOUS ARTICLES

Index to Volume 1	Dec 80	23
Disk drives questions and answers - Pt.2 DOS types	Dec 80	3
Superdos forum - chaining, zaps	Dec 80	5
Writing programs with sound for publication	Mar 81	2
For disk beginners - upgrading L2 programs for disk use	Mar 81	4
Why wasn't I told (m.l. uses)	Mar 81	7
Peeking (U.K.)	May 81	7
Peeking (U.K.)	Aug 81	2
Using L2 programs from disk	Aug 81	3
Reversing the role of PRINT & LPRINT	Aug 81	6
Theory & techniques of sorting - Part 1	Sep 81	7
Theory & techniques of sorting - Part 2	Nov 81	7

CONTINUED FROM PAGE 5

for the Model I. INSTR allows the user to search a string for a specified target section. DEFUSR is included as is HEX$. Many Level III commands are implemented in Extended Color Basic.

Joysticks are 'read' by the JOYSTIK command. Another way is to EXECute HEX AØØA and PEEK the values stored in (left joystick) Up/Down 15A, Right/Left 15B, (right joystick) Up/Down 15C, Right/Left 15D.

The processor used in the Colour Computer is a Motorola MC 6809 E running at slightly less than .9Mhz. To increase the processor speed try POKE 65495,Ø. The cursor will immediately start flashing more quickly. Do not use cassette I/O, SOUND or PLAY commands. These sound generation commands will not sound the way you planned. The MC6809 E processor is one of the most powerful 8 bit micro-processors available with several 16 bit operations. For very complete and thorough discussion regarding the construction, hardware design I suggest you read "BYTE' March 1981 issue. This article also shows requirements for building your own ROM paks.

Cassette operation on the Colour Computer is different to the Model I in that OPEN and CLOSE are used for data files. Transfer of cassette information is at a fast and reliable 1500 baud.

Available Software:

Radio Shack have several cartridges available. All these are aimed squarely at the home user, and are quite 'idiot proofed' for this purpose.

Cartridges I have and can recommend from experience are :-

1. Diagnostic Pak - this is fine for testing your new and shiny Colour Computer, but apart from that...

2. Pinball - has a built in playing field which is not very exciting. BUT you can create your own design using the joysticks and save your masterpiece onto cassette tape for future reloading. Tilt function and extra ball are included in this well-designed package.

3. Quaser Commander - is a space 'Seek and Destroy' type game with 3-dimensional aspect to the display. The enemy can be stationary or try to escape. You can put your craft on 'auto pilot', view the radar, vary your throttle setting, kill, destroy - marvellous! If you liked Instant Software's Cosmic Patrol, you will love QUASER.

4. Football - is American grid iron game for two players each controlling their own team. Offensive and defensive plays are included. The animation is very good with men running all over the screen.

5. Dino Wars - is a two player game. Each player controls his/her dinosaur trying to sneak up behind his/her opponent and bite the enemy on the neck. Graphics are superb as are the sound effects. Suggest for kids 8 to 80. This game is highly recommended. Great for giving the wife a beating etc...

Several more cartridges are available and more are being released soon. Software is available from independant sources. One warning: Be careful what you buy as there is some low quality material around. I know - I have bought some real junk. But, in amongst the junk, there are some brilliant games - Asteroids, Invaders, Adventure etc. available in the U.S.A. Many utilities/ programming aids are also available - monitors, editor/assemblers etc.

Conclusion:

I heartily recommend this machine as a home computer. For games enthusiasts like myself it is exceptional. With unlimited expansion capabilities via the cartridge slot, the user can expect many products, languages etc. in the future.

PRICES:

The following is a list of prices for the TRS-80 Colour Computer in Australia:

Basic Colour Computer with 4K RAM	$599.00
Colour Computer with Extended Colour BASIC 16K RAM	$849.00
Colour Computer with Extended Colour BASIC 32K RAM	$1,029.00
Pair of joysticks	$39.95
Disk drive Ø	$699.00
Disk drives 1, 2 and 3	$499.00
ROMpaks	$39.95 - $59.95

CONTINUED FROM PAGE 2

To test whether your machine has lower-case, type in POKE 15872,97 <ENTER/NEWLINE> . A lower-case a should be printed near the centre of the screen. If it is, then you only need a lower-case driver program to obtain lower-case in BASIC. If an upper-case A is printed then you will need a hardware modification such as that available from MICRO-80.

***** A WORD FROM THE SOFTWARE EDITOR - by Charlie Bartlett *****

Due to the Christmas break, combined with a higher than normal receipt of software, the software department now has a severe backlog of software to examine. If you sent in software just before Christmas, (early December onwards) don't panic - it will be several weeks before you hear anything.

I also get enquiries from readers who have had software accepted for publication several months ago, and who are (naturally) wondering if and when their program will be published. As, at the time of writing, I have enough programs on hand for about 9 months and couple that with the need to balance the content of the magazine, you can see that programs very rarely get accepted and published in the space of a few weeks. As I said above, the content of the magazine has to be balanced. You might, for instance, send in a very, very, very good program dealing with, say, XLOTTO. (It would HAVE to be good). To take XLOTTO as an example I have three XLOTTO programs that are GOOD and deal with the subject in interesting and different ways. If I included each XLOTTO in, say, three issues, one after the other, that would be very boring, no matter how good each program is. So I space them well apart, which gives you the variety but, of course, leaves the author wondering when his program will appear. There are exceptions of course. If you send in something that is either very original, very useful or just happens to achieve the balance of content that we are looking for, for a particular issue, then you come to the top of the pile.

So if you have been sitting on the edge of your seat waiting to see your program in print - don't. Sit back and relax. It WILL appear! We haven't forgotten you and we haven't lost it.

- 0000000000 -

★ ★ SOFTWARE SECTION ★ ★

***** TRIANGLE SOLUTIONS LI/4K - by B. Smith *****

This program is designed to calculate unknown sides, angles and area of any triangle. In all cases side "S1" must be known and at least two other variables (sides or angles). Conversion from degrees, minutes and seconds to decimal degrees can be carried out on screen.

As the calculations call for numerous trigonometric functions, and as these are not inherent in level I ROM's, a call to Tandy's subroutines at line 3ØØØØ is required.

It calculates all unknowns quickly and, in some cases, two solutions whenever doubt exists if opposite angles are acute or obtuse.

This program should be handy to anyone who requires areas for concrete pours, builder for roof truss lengths or the student to check homework calculations.

Instructions start at line 25ØØ; triangle drawing at line 2ØlØ; input questions line lØØ; triangle solutions at line 35Ø and trigonometric functions at line 3ØØØØ.

```
1  REM* TRIANGLE SOLUTIONS FOR THE TRS-80,LEVEL 1,16 K*
2  REM * DESIGNED BY BRUCE SMITH *
3  REM * OF 7 INNES STREET ALBANY W.A.*
4  REM * APPROXIMATELY 8 K OF RAM IS USED *
10  CLS
20  P.A.270,"......TRIANGLE   SOLUTIONS......"
30  P.A.326,"DO YOU REQUIRE INSTRUCTIONS.(YES = 1 , NO = 2)";:IN.Z
40  IFZ=1GOS.2500
45  GOS.2010
100  P.A.385,"LENGTH OF SIDE S1 =";:I.A:IFA=OT.103
101  IFA<OT.300
102  P.A.418,"=";A:G.105
103  CLS:P.A.533,"SIDE S1 MUST BE KNOWN":F.N=1TO2000:N.N:G.45
105  P.A.449,"ANGLE A1 =";:I.B:IFB=OT.112
106  IFB<OT.300
107  P."IN D.MS (Y=1,N=2)";:IN.R
108  IFR=1GOS.3000:IFB>=100T.110
109  P.A.482,"=";B:G.111
110  W=B-100:P.A.482,"= 100 +";W
111  IFB>=180T.302
112  P.A.513,"LENGTH OF SIDE S2 =";:I.C:IFC=OT.116
113  IFC<OT.300
```

```
115  P.A.546,"=";C
116  P.A.577,"ANGLE A2 =";:I.D:IFD=0T.123
117  IFD<0T.300
118  P."IN D.MS (Y=1,N=2)";:IN.S
119  IFS=1GOS.3100:IFD>=100T.121
120  P.A.610,"=";D:G.122
121  V=D-100:P.A.610,"= 100 +";V
122  IFD>=180T.302
123  P.A.641,"LENGTH OF SIDE S3 =";:I.E:IFE=0T.128
124  IFE<0T.300
125  IFE=0T.128
126  P.A.674,"=";E
128  P.A.705,"ANGLE A3 =";:I.F:IFF=0T.134
129  IFF<0T.300
130  P."IN D.MS (Y=1,N=2)";:IN.T:IFT=1GOS.3200
131  IFF>=100T.133
132  P.A.738,"=";F:G.134
133  U=F-100:P.A.738,"= 100 +";U
134  IFF>=180T.302
135  P.A.768,"                                                    "
136  P.A.785,"SQUARE AREA":P.A.802,"="
137  H=B+D+F:IFH>180T.302
138  H=A*E*F:IFH=0T.140
139  IFH>0T.428
140  H=A*C*E:IFH=0T.142
141  IFH>0T.350
142  H=F*A*B:IFH=0T.144
143  IFH>0T.375
144  H=A*B*D:IFH=0T.146
145  IFH>0T.386
146  H=A*B*C:IFH=0T.148
147  IFH>0T.396
148  H=A*C*D:IFH=0T.150
149  IFH>0T.406
150  H=A*C*F:IFH=0T.304
151  IFH>0T.437
299  END
300  CLS:P.A.460,"SIDES AND ANGLES CAN NOT BE LESS THAN ZERO"
301  F.N=1T02000:N.N:G.45
302  CLS:P.A.459,"ANGLES CAN NOT BE GREATER THAN 180 DEG'S"
303  F.X=1T02000:N.X:G.45
304  CLS
305  P.A.453,"I'M SORRY, YOU HAVEN'T SUPPLIED SUFFICIENT INFORMATION"
306  F.N=1T02000:N.N:G.45
350  P=(A+C+E)/2
351  Q=(P*(P-C))/(A*E):X=Q:GOS.30030:S=Y
352  GOS.30500:F=Y*2:IFF>=100T.354
353  P.A.738,"=";F:G.355
354  U=F-100:P.A.738,"= 100 +";U
355  Q=(P*(P-A))/(C*E):X=Q:GOS.30030:S=Y
356  GOS.30500:D=Y*2:IFD>=100T.358
357  P.A.610,"=";D:G.359
358  V=D-100:P.A.610,"= 100 +";V
359  B=180-(D+F)
360  IFB>=100T.362
361  P.A.482,"=";B:G.363
362  W=B-100:P.A.482,"= 100 +";W
363  X=F:GOS.30370:G=(A*E*Y)/2
364  P.A.802,"=";G
365  P.A.896,"ANOTHER RUN (YES = 1, NO = 2)";:I.I:IFI=1T.45
366  P.A.896,"WANT TO CONVERT ANGLES TO DEG'S MIN SEC.(Y=1,N=2)";:I.M
367  IFM=2T.30850
368  P.A.896,"                                                    "
369  P.A.896,"ANGLE = (DEG'S)";:I.X:Y=(X-INT(X))*60
370  Z=(Y-INT(Y))*60
371  P.A.925,"=";INT(X):P.A.931,INT(Y);"'":P.A.936,INT(Z)
372  P.A.939,"''":P.A.942,"AGAIN (Y=1,N=2)";:I.N:IFN=1T.368
373  P.A.896,"                                                    "
374 G.365
375  D=180-(F+B):IFD>=100T.402
376  P.A.610,"=";D:G.378
377  V=D-100:P.A.610,"= 100 +";V
378  X=F:GOS.30370:J=Y*A
379  X=D:GOS.30370:C=J/Y
380  P.A.546,"=";C
381  X=F:GOS.30350:K=Y*A
382  X=D:GOS.30350:E=C*Y
383  E=E+K:P.A.674,"=";E
```

```
384  X=F:GOS.30370:G=(Y*A*E)/2
385  P.A.802,"=";G:G.365
386  F=180-(B+D):IFF>=100T.389
387  IFD<OT.304
388  P.A.738,"=";F:G.390
389  U=F-100:P.A.738,"= 100 +";U
390  X=F:GOS.30370:J=(Y*A)
391  X=D:GOS.30370:C=(J/Y)
392  P.A.546,"=";C
393  X=F:GOS.30350:K=A*Y
394  X=D:GOS.30350:E=C*Y:E=(E+K)
395  P.A.674,"=";E:G.384
396  X=B:GOS.30350:J=Y*2*A*C
397  E=(A*A)+(C*C)-J:X=E:GOS.30010
398  E=Y:P.A.674,"=";E
399  P=(A+C+E)/2:K=(P*(P-A))/(C*E)
400  X=K:GOS.30010:S=Y:GOS.30500:D=Y*2:IFD>=100T.402
401  P.A.610,"=";D:G.403
402  V=D-100:P.A.610,"= 100 +";V
403  F=180-(B+D):IFF<=OT.304:IFF>=100T.405
404  P.A.738,"=";F:G.384
405  U=F-100:P.A.738,"= 100 +";U:G.384
406  J=C/A:X=D:GOS.30370:S=Y*J:GOS.30530:F=Y:IFF>=100T.408
407  P.A.738,"=";F:G.409
408  U=F-100:P.A.738,"= 100 +";U
409  B=180-(D+F):IFB>=100T.411
410  P.A.482,"=";B:G.412
411  W=B-100:P.A.482,"= 100 +";W
412  X=B:GOS.30350:X=(A*A)+(C*C)-(2*A*C*Y):GOS.30010:E=Y:P.A.674,"=";E
413  X=F:GOS.30370:G=(Y*A*E)/2:P.A.802,"=";G:IFA>=CT.365
414  F=180-F:P.A.370,"< OR >":P.A.434,A:P.A.562,C:P.A.626,D
415  IFF>=100T.417
416  P.A.818,F:G.418
417  U=F-100:P.A.751,"100+";U
418  B=180-(D+F):IFB>=100T.420
419  P.A.498,B:G.421
420  W=B-100:P.A.495,"100+";W
421  X=B:GOS.30350:X=(A*A)+(C*C)-(2*A*C*Y):GOS.30010
422  E=Y:P.A.690,E
423  X=F:GOS.30370:G=(A*E*Y)/2:P.A.818,G
424  G.365
428  X=F:GOS.30350:X=(A*A)+(E*E)-(2*A*E*Y)
429  GOS.30010:C=Y:P.A.546,"=";C
430  P=(A+C+E)/2:Q=(P*(P-A))/(C*E):X=Q
431  GOS.30010:S=Y:GOS.30500:D=Y*2:IFD>=100T.433
432  P.A.610,"=";D:G.434
433  V=D-100:P.A.610,"= 100 +";V
434  B=180-(D+F):IFB>=100T.436
435  P.A.482,"=";B:G.363
436  W=B-100:P.A.482,"= 100 +";W:G.363
437  P.A.418,"=";A:P.A.546,"=";C
438  IFF>=100T.440
439  P.A.738,"=";F:G.441
440  U=F-100:P.A.738,"= 100 +";U
441  X=F:GOS.30370:D=(A*Y)/C:S=D:GOS.30530:D=Y
442  IFD>=100T.444
443  P.A.610,"=";D:G.445
444  V=D-100:P.A.610,"= 100 +";V
445  B=180-(D+F):IFB>=100T.447
446  P.A.482,"=";B:G.448
447  W=B-100:P.A.482,"= 100 +";W
448  X=B:GOS.30350:X=(A*A)+(C*C)-(2*A*C*Y):GOS.30010
449  E=Y:P.A.674,"=";E
450  X=F:GOS.30370:G=(A*E*Y)/2:P.A.802,"=";G
451  IFA<=CT.365
452  P.A.370,"< OR >":P.A.434,A:P.A.562,C
453  IFF>100T.455
454  P.A.754,F:G.456
455  U=F-100:P.A.751,"100+";U
456  D=180-D:IFD>=100T.458
457  P.A.626,D:G.459
458  V=D-100:P.A.623,"100+";V
459  B=180-(D+F):IFB>100T.461
460  P.A.498,B:G.462
461  W=B-100:P.A.495,"100+";W
462  X=B:GOS.30350:X=(A*A)+(C*C)-(2*A*C*Y):GOS.30010
463  E=Y:P.A.690,E
```

```
 464  X=F:GOS.30370:G=(Y*A*E)/2
 465  P.A.818,G:G.365
2010   CLS:X=0:Y=0
2011   P.A.273,"A3"
2012   P.A.148,"S1"
2013   P.A.29,"A1"
2014   P.A.168,"S2"
2015   P.A.301,"A2"
2016   P.A.349,"S3"
2020 F.X=40TO61:Y=32-INT(.5*X)
2025 IFY=26.2040
2030 S.(X,Y):N.X
2040 F.X=61TO87:Y=INT(.333*X)-16
2045 IFY=13G.2060
2050 S.(X,Y):N.X
2060 F.X=82TO44STEP-2:Y=12:S.(X,Y):N.X
2065   RET.
2500   CLS
2510   P.A.14,"......TRIANGLE SOLUTIONS......"
2520   P."THIS PROGRAM WILL CALCULATE THE LENGTH OF UNKNOWN"
2530   P."SIDES, UNKNOWN ANGLES & AREA. ACCURACY AT LEAST TO TWO"
2540   P."DECIMAL PLACES CAN BE EXPECTED BUT WILL DIMINISH WITH"
2550   P."SMALLER ANGLES."
2560   P."FOR SIDES OR ANGLES WHICH ARE UNKNOWN ENTER 0 (ZERO)."
2570   P."IN ALL PROBLEMS  'S1 ' MUST BE KNOWN, AS WELL AS "
2580   P."TWO OTHER SIDES OR ANGLES."
2590   P."A PERIOD MUST BE USED AFTER THE NUMBER OF WHOLE DEGREE'S,"
2600   P."FOR EXAMPLE :-"
2610   P."112 DEG'S  13 MIN  57 SEC   =  112.1357"
2620   P."THIS ANGLE IS THEN IN  <  D.MS  > (DEG'S .MIN SEC).THE"
2630   P."COMPUTER WILL THEN CONVERT THE ANGLES TO DECIMAL DEGREE'S."
2640   P."OUTPUT IS ALSO IN DECIMAL DEG'S BUT CAN BE CONVERTED TO"
2650   P."D.MS ON THE SCREEN."
2660   I."PRESS  <ENTER> TO RUN";A$
2670   RET.
3000   X=INT(B)
3001   Y=(B-X)*100
3002   Z=(Y-INT(Y))*100
3003   B=((Z/60)+INT(Y))/60+INT(B)
3004   RET.
3100   X=INT(D)
3101   Y=(D-X)*100
3102   Z=(Y-INT(Y))*100
3103   D=((Z/60)+INT(Y))/60+INT(D)
3104   RET.
3200   X=INT(F)
3201   Y=(F-X)*100
3202   Z=(Y-INT(Y))*100
3203   F=((Z/60)+INT(Y))/60+INT(F)
3204   RET.
5000   IFR>0G.5010
5005   P."WHAT.THIS ANGLE IS LESS THAN 0":F.N=1TO3000:N.N
5006   RET.
5010   S=R:S=S*100:S=S-INT(S):S=S/60
5020   P."S=";S:F.N=1TO3000:N.N:RET
30000   E.
30010   REM *SQUARE ROOT* IN. X, OUT Y
30020   REM ALSO USES W & Z INTERNALLY
30030   IF X=0T.Y=0:RET.
30035   W=0:Z=0
30040   IFX>0T.30060
30050   P. "ROOT OF NEGATIVE NUMBER ?":STOP
30060   Y=X*.5:Z=0
30070   W=(X/Y-Y)*.5
30080   IF(W=0)+(W=Z)T.RET.
30090   Y=Y+W:Z=W:G.30070
30300   REM *TANGENT* IN.  X IN DEG'S,OUTPUT Y
30310   REM ALSO USES A,C,W,Z INTERNALLY
30320   A=X:GOS.30360
30330   IF ABS(Y)<1E-5T.P."TANGENT UNDEFINED":ST.
30340   C=Y:X=A:GOS.30376:Y=Y/C:RET.
30350   REM *COSINE* IN.  X IN DEG'S,OUTPUT Y
30351   REM ALSO USES W,Z INTERNALLY
30360   W=ABS(X)/X:X=X+90:GOS.30376:IF(Z=-1)*(W=1)T.Y=-Y
30365   RET.
30370   REM *SIN* IN.X IN DEG'S,OUTPUT Y
30371   REM ALSO USES Z INTERNALLY
30376   Z=ABS(X)/X:X=Z*X
```

```
30380  IFX>360T.X=X/360:X=(X-INT(X))*360
30390  IFX>90T.X=X/90:Y=INT(X):X=(X-Y)*90:ONYG.30410,30420,30430
30400  X=X/57.29578:IF ABS(X)<2.48616E-4 Y=0:RET.
30405  G.30440
30410  X=90-X:G.30400
30420  X=-X:G.30400
30430  X=X-90:G.30400
30440  Y=X-X*X*X/6+X*X*X*X*X/120-X*X*X*X*X*X*X/5040
30450  Y=Y+X*X*X*X*X*X*X*X*X/362880:IFZ=-1T.Y=-Y
30455  RET.
30500  REM * ARCCOS * IN. S, OUT Y,W
30510  REM Y IS IN DEGREES,W IS IN RADIANS
30520  GOS.30550:Y=90-Y:W=1.570796-W:RET.
30530  REM * ARCSIN * IN.S,  OUT Y,W
30535  REM Y IS IN DEGREES, W IS IN RADIANS
30540  REM ALSO USES VARIABLES X, Z INTERNALLY
30550  X=S:IFABS(S)<=.707107T.30610
30560  X=1-S*S:IFX<0T.P.S;"IS OUT OF RANGE":STOP
30570  W=X/2:Z=0
30580  Y=(X/W-W)/2:IF(Y=0)+(Y=Z)T.X=W:G.30610
30600  W=W+Y:Z=Y:G.30580
30610  Y=X+X*X*X/6+X*X*X*X*X*X*.075+X*X*X*X*X*X*X*X*4.464286E-2
30620  W=Y+X*X*X*X*X*X*X*X*X*X*3.038194E-2
30625  IFABS(S)>.707107T.W=1.570796-W
30630  Y=W*57.29578:RET.
30660  REM * ARCTANGENT * IN. X , OUT C, A
30670  REM C IS IN DEGREES. A IS IN RADIANS
30680  REM ALSO USES B, T INTERNALLY
30690  GOS. 30810:X=ABS(X):C=0
30700  IFX>1T.C=1:X=1/X
30710  A=X*X
30720  B=((2.86623E-3*A-1.61657E-2)*A+4.29096E-2)*A
30730  B=((((B-7.5289E-2)*A+.106563)*A-.142089)*A+.199936)*A
30740  A=((B-.333332)*A+1)*X
30750  IFC=1T.A=1.570796-A
30760  A=T*A:C=A*57.29578:RET.
30800  REM * SIGN * IN. X , OUT T= -1, 0 OR +1
30810  IFX<0T.T=-1
30820  IFX=0T.T=0
30830  IFX>0T.T=1
30840  RET.
30850  CLS:E.
```

***** 3D MAZE L2/16K - by S. Holloway *****

The program produces a 3-D display of the player's position in a maze, allowing him/her to turn and move. The aim is to find the exit with the fewest turns, moves and looks at the map.

Program Action

A single two-dimensional array is used for the maze cell data. Each cell can have a value of 0-15 (higher value is used to identify border). Each bit (1,2,3,8) represents a wall so Ø means no walls, 1 a West wall, 2 a North wall, 3 a North and a West wall and so on.

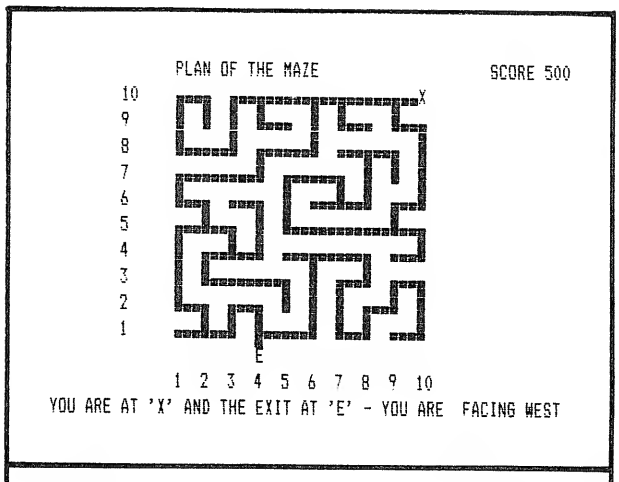
The maze is made by making a random route until a dead end is met. Then a new route is attached to the first and this proceeds randomly until dead end. Another route added, and so on until all cells have been used. An exit is made on the South edge and the maze is complete.

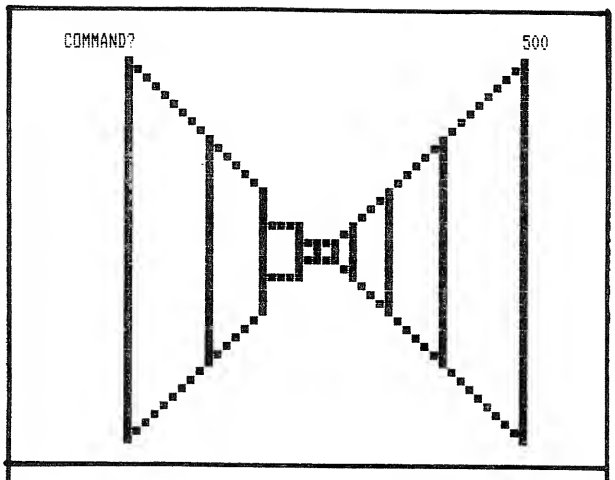
To display a correct 3-D picture of the player's position, the program rotates the cell information using a logical shift. A cell having a value of 11 has a West wall (1), a North wall (2) and a South wall (8). If the player is facing East the cell is rotated right once, i.e. 1Ø11 becomes 11Ø1 or 13 - this signifies a left wall, a right wall and a wall behind which is, of course, not displayed.

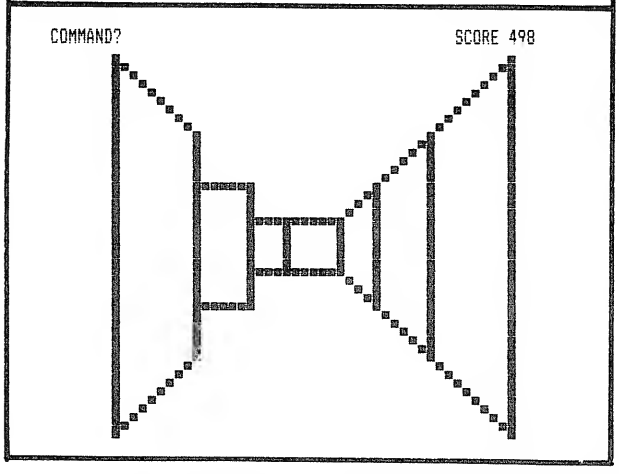
The 'help' routine prints a map of the maze and marks the player's position with a flashing 'X'. The keyboard is disabled during the map display so it cannot be held longer than a set time.

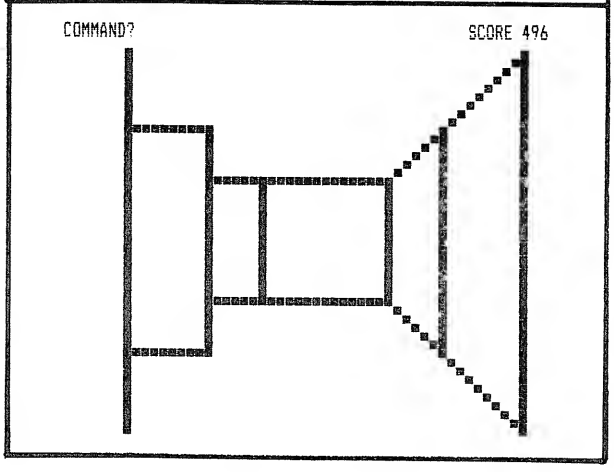
A hint for players is to remember the direction you are facing and remember the exit is only obvious when you are right next to it.

As only 8K of memory is used there is room to add extras like random hazards and even develop a full adventure-type program. In this case it would be necessary to change the route-making section as the present method produces a simple connected maze, i.e. only one route and no loops.










```
10 RANDOM:REM SET ARRAY AND INSTRUCTIONS
20 DEFINTA-Z:CLS
30 GOSUB 2760:S=1000
40 DIMA(11,11):FORI=1TO10:FORJ=1TO10:A(I,J)=15:NEXTJ:NEXTI
50 FORJ=0TO11:A(J,0)=100:A(J,11)=100:A(0,J)=100:A(11,J)=100:NEXT
J
60  GOSUB2810
70 REM FIND START
80 X=RND(10):Y=1:XX=X:YY=Y
90 D=RND(3):ONDDGOTO100,110,120
100 IFA(X-1,Y)=15THEND=1:A(X,Y)=14:X=X-1:Z=4:GOTO 130
110 IFA(X+1,Y)=15THEND=4:A(X,Y)=11:X=X+1:Z=2:GOTO130
120 IFA(X,Y+1)=15THEND=8:A(X,Y)=7:Y=Y+1:Z=3:GOTO 130
130 D2=D
140 REM BEGIN ROUTE FINDING
150 GOSUB 170:IF F=1 THEN 390
160 GOTO 180
170 F=0:IFA(X+1,Y)<>15ANDA(X-1,Y)<>15ANDA(X,Y+1)<>15ANDA(X,Y-1)<
>15THENF=1:RETURNELSERETURN
180 R=RND(3):IFR=1THEND1=D*2:IFD1>8THEND1=D1/16
190 IFR=2THEND1=DELSEIFR=3THEND1=D/2:IFD1<1THEND1=8
200 REM SET ARRAY
210 IFD1=4THEN340ELSEIFD1=1THEN260ELSEIFD1=8THEN300ELSE220
220 IF A(X,Y-1)<>15THEN180
230 IFD=2THENA(X,Y)=5:Y=Y-1:GOTO 380
240 IFD=1THENA(X,Y)=9:Y=Y-1:GOTO380
250 IFD=4THENA(X,Y)=12:Y=Y-1:GOTO380
260 IFA(X-1,Y)<>15THEN180
270 IFD=2THENA(X,Y)=6:X=X-1:GOTO380
280 IFD=1THENA(X,Y)=10:X=X-1:GOTO380
290 IFD=8THENA(X,Y)=12:X=X-1:GOTO380
300 IFA(X,Y+1)<>15THEN180
310 IFD=1THENA(X,Y)=3:Y=Y+1:GOTO380
320 IFD=8THENA(X,Y)=5:Y=Y+1:GOTO380
330 IFD=4THENA(X,Y)=6:Y=Y+1:GOTO380
340 IFA(X+1,Y)<>15THEN180
350 IFD=2THENA(X,Y)=3:X=X+1:GOTO380
360 IFD=8THENA(X,Y)=9:X=X+1:GOTO380
370 IFD=4THENA(X,Y)=10:X=X+1:GOTO380
380 N=N+1:D=D1:GOTO 140
390 REM DEAD END
400 IFD=1THENA(X,Y)=11:N=N+1
410 IFD=2THENA(X,Y)=7:N=N+1
```

```
420 IFD=4THENA(X,Y)=14:N=N+1
430 IFD=8THENA(X,Y)=13:N=N+1
440 REM FIND SPACES
450 FORJ=1TO10:FORI=1TO10:IF A(I,J)=15THENX=I:Y=J:GOTO 470
460 NEXTI:NEXTJ:GOTO 520
470 IFA(X+1,Y)>0AND A(X+1,Y)<15 THEN X=X+1:A(X,Y)=A(X,Y)-1:D=1:X
=X-1:GOTO 140
480 IFA(X-1,Y)>0ANDA(X-1,Y)<15THENA(X-1,Y)=A(X-1,Y)-4:D=4:GOTO14
0
490 IFA(X,Y+1)>0ANDA(X,Y+1)<15THENA(X,Y+1)=A(X,Y+1)-2:D=2:GOTO 1
40
500 IF A(X,Y-1)>0ANDA(X,Y-1)<15THENA(X,Y-1)=A(X,Y-1)-8:D=8:GOTO1
40
510 GOTO 460
520 REM MAKE EXIT
530 X1=RND(10):A(X1,10)=A(X1,10)-8
540 X=XX:Y=YY:GOTO 880
550 END
560 REM DISPLAY
570 CLS:PRINT"                PLAN OF THE MAZE                    S
CORE";S
580 J=1
590 I=1:PRINT"       ";11-J;:IFJ=1THENPRINT"  ";ELSEPRINT"   ";
600 ONA(I,J)GOTO 620,630,640,650,660,670,680,690,700,710,720,730
,740,750,760
610 PRINTCHR$(140);CHR$(191);CHR$(140);:GOTO770
620 PRINTCHR$(32);CHR$(191);CHR$(140);:GOTO 770
630 PRINTCHR$(140);CHR$(188);CHR$(140);:GOTO770
640 PRINTCHR$(32);CHR$(188);CHR$(140);:GOTO770
650 PRINTCHR$(140);CHR$(191);CHR$(32);:GOTO770
660 PRINTCHR$(32);CHR$(191);CHR$(32);:GOTO770
670 PRINTCHR$(140);CHR$(188);CHR$(32);:GOTO770
680 PRINTCHR$(32);CHR$(188);CHR$(32);:GOTO770
690 PRINTCHR$(140);CHR$(143);CHR$(140);:GOTO770
700 PRINTCHR$(32);CHR$(143);CHR$(140);:GOTO770
710 PRINTCHR$(140);CHR$(140);CHR$(140);:GOTO770
720 PRINTCHR$(32);CHR$(140);CHR$(140);:GOTO770
730 PRINTCHR$(140);CHR$(143);CHR$(32);:GOTO770
740 PRINTCHR$(32);CHR$(143);CHR$(32);:GOTO770
750 PRINTCHR$(140);CHR$(140);CHR$(32);:GOTO770
760 PRINTCHR$(32);CHR$(140);CHR$(32);
770 I=I+1:IFI<=10 THEN600
780 PRINT:J=J+1:IFJ<=10 THEN590
790 PRINT@715+3*X1,"E"
800 PRINT"               1  2  3  4  5  6  7  8  9  10"
810 PRINT"YOU ARE AT 'X' AND THE EXIT AT 'E' - ";
820 PRINT"YOU ARE ";:GOSUB 970
830 T=50:P1=PEEK(15371+3*X+64*Y)
840 T=T-1:IFT<1THEN RETURN:PRINT@53,S;
850 PRINT@11+3*X+64*Y,"X";:FORI=1TO100:NEXTI
860 PRINT@11+3*X+64*Y,CHR$(P1);:FORI=1TO100:NEXTI
870 GOTO 840
880 REM SET TO GO
890 PRINT"                   MAZE COMPLETE":PRINT
900 PRINT"EXIT IS AT";X1;"EAST, 1 NORTH"
910 PRINT:GOSUB950:PRINT
920 INPUT"READY";Z$
930 GOTO 1470
940 REM HELP ROUTINE
950 PRINT"YOU ARE AT";X;"EAST"
960 PRINT"          ";11-Y;"NORTH"
970 PRINT" FACING ";
980 ONZGOTO990,1000,1010,1020
990 PRINT"NORTH":GOTO 1030
1000 PRINT"EAST":GOTO1030
1010 PRINT"SOUTH":GOTO1030
1020 PRINT"WEST"
1030 RETURN
1040 REM INPUT ROUTINE
1050 IFS<1THENPRINT"SORRY - YOU RAN OUT OF POINTS !":END
1060 IF Y=11 THEN 2740
1070 PRINT@0,"COMMAND?       ";:Z$=INKEY$:IFZ$=""THEN1070
1080 IFZ$="L"THENS=S-5:Z=Z-1:GOTO 1130
1090 IFZ$="R"THENS=S-5:Z=Z+1:GOTO 1130
1100 IFZ$="H"THENS=S/2:POKE16405,0:GOSUB 560:POKE16405,1:GOTO147
0
1110 IFZ$="F"THEN S=S-2:GOTO 1410
```

```
1120 PRINT@0,"L FOR LEFT,R FOR RIGHT,F FOR FOREWARD,H FOR HELP
";:FORI=1TO2000:NEXTI:PRINT@0,"
                    ";:GOTO 1070
1130 IFZ<1THENZ=Z+4ELSEIFZ>4THENZ=Z-4
1140 GOSUB 1150:GOTO 1470
1150 REM ROTATE AND LOOK ROUTINE
1160 IF B>10 THEN GOTO1260
1170 F=A(A,B)
1180 IFZ=1THEN 1220
1190 FORI=2TOZ
1200 F=INT(F/2)+(F-INT(F/2)*2)*8
1210 NEXTI
1220 C=F-INT(F/2)*2
1230 D=INT(F/4)-INT(F/8)*2
1240 E=INT(F/2)-INT(F/4)*2
1250 RETURN
1260 REM OUTSIDE
1270 C=0:D=0:E=-1
1280 RETURN
1290 REM NEXT CELL
1300 IFE>0THEN1370
1310 IFZ=1THENB=B-1
1320 IFZ=2THENA=A+1
1330 IFZ=3THENB=B+1
1340 IFZ=4THENA=A-1
1350 RETURN
1360 REM MESSAGE
1370 IFE=1THENPRINT@532,"NO WAY !!";
1380 FORJ=1TO1000:NEXTJ
1390 RETURN
1400 REM FOREWARD
1410 A=X:B=Y
1420 GOSUB 1150
1430 GOSUB 1290
1440 X=A:Y=B
1450 IF E>0 THEN 1050
1460 REM START OF 3-D DISPLAY
1470 A=X:B=Y
1480 GOSUB 1150
1490 FORT=1 TO5
1500 GOSUB 1570
1510 IF E<>0 THEN 1050
1520 GOSUB 1290
1530 GOSUB 1150
1540 IF E=2 THEN 1050
1550 NEXTT
1560 GOTO 1050
1570 ON T GOTO 1580,1700,2060,2370,2590
1580 CLS:PRINT@0,"LAST COMMAND ";Z$;:PRINT@45,"SCORE";S
1590 IFE<0 OR E>1 THEN RETURN
1600 VV=15360:FORI=71 TO  967  STEP 64
1610 POKEVV+I,191
1620 POKEVV+I+44,191
1630 NEXTI
1640 IF E=0 RETURN
1650 FORI=72 TO 114
1660 POKEVV+I,131
1670 POKE VV+I+896,176
1680 NEXTI
1690 RETURN
1700 REM DEPTH 2
1710 IFE<0THEN RETURN
1720 IF C=0THEN1800
1730 K=72:M=968:P=140:Q=P:GOSUB1790
1740 K=K+1:M=M+1:P=176:Q=131:GOSUB 1790:K=K+65:M=M-63:P=131:Q=17
6:GOSUB1790:K=K+1:M=M+1:P=140:Q=140:GOSUB1790
1750 K=K+1:M=M+1:P=176:Q=131:GOSUB1790:K=K+65:M=M-63:P=131:Q=176
:GOSUB 1790
1760 K=K+1:M=M+1:P=140:Q=140:GOSUB 1790
1770 K=K+1:M=M+1:P=176:Q=131:GOSUB 1790
1780 GOTO1840
1790 POKEVV+K,P:POKEVV+M,Q:RETURN
1800 FORI=264 TO271
1810 POKEVV+I,131
1820 POKEVV+I+512,176
1830 NEXTI
1840 IF D=0 THEN 1920
1850 K=114:M=1010:P=140:Q=P:GOSUB1790
```

DON'T BE HELD BACK BY AN ANTIQUATED DISK OPERATING SYSTEM

MOVE UP TO

NEWDOS 80 **$149 incl. p&p**

NEWDOS 80 is a completely new DOS for the TRS-80 SYSTEM 80. It is well-documented, bug free and increases the power of your system many times over. It is upward compatible with TRSDOS AND NEWDOS (ie TRSDOS and NEWDOS+ programs will run on NEWDOS 80 but the reverse is not necessarily so).

These are just a few of the many new features offered by NEWDOS 80.

* New BASIC commands that support variable record lengths up to 4095 bytes long.
* Mix or match disk drives. Supports any track count from 18 to 96. Use 35, 40, 77 or 80 track 5¼ inch mini disk drives, 8 inch disk drives OR ANY COMBINATION.
* An optional security boot-up for BASIC or machine code application programs. User never sees "DOS-READY" or "READY" and is unable to "BREAK", clear screen or issue any direct BASIC statements, including "LIST".
* New editing commands that allow program lines to be deleted from one location and moved to another or to allow the duplication of a program line with the deletion of the original.
* Enhanced and improved RENUMBER that allows relocation of subroutines.
* Create powerful chain command files which will control the operation of your system.
* Device handling for routing to display and printer simultaneously.
* MINIDOS — striking the D, F and G keys simultaneously calls up a MINIDOS which allows you to perform many of the DOS commands without disturbing the resident program.
* Includes Superzap 3.0 which enables you to display/print/modify any byte in memory or on disk.
* Also includes the following utilities:
  - Disk Editor/Assembler
  - Disassembler (Z80 machine code)
  - LM offset — allows transfers of any system tape to Disk file — automatically relocated.
  - LEVEL I — Lets you convert your computer back to Level 1.
  - LVIDKSL — Saves and loads Level 1 programs to disk.
  - DIRCHECK — Tests disk directories for errors and lists them.
  - ASPOOL — An automatic spooler which routes a disk file to the printer whilst the computer continues to operate on other programs.
  - LCDVR — a lower case drives which display lower case on the screen if you have fitted a simple lower case modification.

DISK DRIVE USERS ELIMINATE CRC ERRORS AND TRACK LOCKED OUT MESSAGES FIT A PERCOM DATA SEPARATOR

$37.00 plus $1.20 p&p.

When Tandy designed the TRS-80 expansion interface, they did not include a data separator in the disk-controller circuitry, despite the I.C. manufacturer's recommendations to do so. The result is that many disk drive owners suffer a lot of Disk I/O errors. The answer is a data separator. This unit fits inside your expansion interface. It is supplied with full instructions and is a must for the serious disk user.

MPI DISK DRIVES HIGHER PERFORMANCE — LOWER PRICE

MPI is the second largest manufacturer of disk drives in the world. MPI drives use the same form of head control as 8" drives and consequently, they have the fastest track-to-track access time available — 5msec! All MPI drives are capable of single or double-density operation. Double-density operation requires the installation of a PERCOM doubler board in the expansion interface.

As well as single head drives, MPI also makes dual-head drives. A dual-head drive is almost as versatile as two single-head drives but is much cheaper.

Our MPI drives are supplied bare or in a metal cabinet — set up to operate with your TRS-80 or SYSTEM 80. All drives are sold with a 90 day warranty and service is available through MICRO-80 PRODUCTS.

MPI B51 40 Track Single Head Drive. . . . . only $349
MPI B52 40 Track Double Head Drive. . . . . only $449

Prices are for bare drives and include p&p. Add $10.00 per drive for a cabinet and $60.00 for a power supply to suit two drives. 40 track drives are entirely compatible with 35 track drives. A 40 track DOS such as NEWDOS 80 is necessary to utilise the extra 5 tracks.

OVER 800 KILOBYTES ON ONE DISKETTE! WITH MPI 80 TRACK DRIVES

MPI 80 track drives are now available. The B91 80 track single-head drive stores 204 Kilobytes of formatted data on one side of a 5¼ inch diskette in single-density mode. In double-density mode it stores 408 Kilobytes and loads/saves data twice as quickly.

The B92 80 track dual-head drive stores 204 Kilobytes of formatted data on EACH side of a 5¼ inch diskette in single-density mode. That's 408 Kilobytes per diskette. In double-density mode, the B92 stores a mammoth 408 Kilobytes per side or 816 Kilobytes of formatted data per diskette. With two B92's and a PERCOM double, you could have over 1.6 Megabytes of on line storage for your TRS-80 for less than $1500!!

MPI B91 80 Track Single Head Drive. . . . . only $499
MPI B92 80 Track Dual Head Drive . . . . . only $619

Prices are for bare drives and include p&p. Add $10.00 per drive for a cabinet and $60.00 for a power supply to suit two drives. Note: 80 track drives will not read diskettes written on a 35 or 40 track drive. If drives with different track counts are to be operated on the same system, NEWDOS 80 must be used.

CARE FOR YOUR DISK DRIVES? THEN USE 3M's DISK DRIVE HEAD CLEANING DISKETTES

$30.20 incl. p&p.

Disk drives are expensive and so are diskettes. As with any magnetic recording device, a disk drive works better and lasts longer if the head is cleaned regularly. In the past, the problem has been, how do you clean the head without pulling the mechanism apart and running the risk of damaging delicate parts. 3M's have come to our rescue with SCOTCH BRAND, non-abrasive, head cleaning diskettes which thoroughly clean the head in seconds. The cleaning action is less abrasive than an ordinary diskette and no residue is left behind. Each kit contains:

- 2 head cleaning diskettes
- 1 bottle of cleaning fluid
- 1 bottle dispenser cap

PLEASE USE ORDER FORM ON PAGE 36

USE TANDY PERIPHERALS ON YOUR SYSTEM-80 VIA SYSPAND-80 - $97.50 incl. p&p

The SYSTEM-80 hardware is not compatible with the TRS-80 in two important areas. The printer port is addressed differently and the expansion bus is entirely different. This means that SYSTEM-80 owners are denied the wealth of economical, high performance peripherals which have been developed for the TRS-80. Until now, that is. MICRO-80 has developed the SYSPAND-80 adaptor to overcome this problem. A completely self-contained unit in a small cabinet which matches the colour scheme of your computer, it connects to the 50-way expansion part on the rear of your SYSTEM 80 and generates the FULL Tandy 40 way bus as well as providing a Centronics parallel printer port. SYSPAND-80 enables you to run an Exatron Stringy Floppy from your SYSTEM 80, or an LNW Research expansion interface or any other desirable peripherals designed to interface to the TRS-80 expansion port. Make your SYSTEM 80 hardware compatible with the TRS-80 via SYSPAND-80.

PROGRAMS BY MICROSOFT

EDITOR ASSEMBLER PLUS (L2/16K) $37.50 + $1.20 p&p

A much improved editor-assembler and debug/monitor for L2/16K TRS-80 or SYSTEM 80. Assembles directly into memory, supports macros and conditional assembly, includes new commands-substitute, move, copy and extend.

LEVEL III BASIC $59.95 plus $1.20 p&p

Loads on top of Level II BASIC and gives advanced graphics, automatic renumbering, single stroke instructions (shift-key entries) keyboard debounce, suitable for L2/16K and up (Not Disk BASIC)

ADVENTURE ON DISK $35.95 plus $1.20 p&p

This is the original ADVENTURE game adapted for the TRS-80. The game fills an entire diskette. Endless variety and challenge as you seek to rise to the level of Grand Master. Until you gain skill, there are whole areas of the cave that you cannot enter. (Requires 32K One Disk)

BASIC COMPILER $208 plus $2.00 p&p

New improved version, the Basic Compiler converts Disk BASIC programs to machine code, automatically. A compiled program runs, on average, 3-10 times faster than the original BASIC program and is much more difficult to pirate.

UPGRADE TO 16K FOR ONLY $30.00!!

MICRO-80's 16K MEMORY EXPANSION KIT HAS BEEN REDUCED IN PRICE EVEN MORE

Larger volume means we buy better and we pass the savings on to you. These are our proven, prime, branded 200 ns (yes, 200 nanosecond) chips. You will pay much more elsewhere for slow, 350 ns. chips. Ours are guaranteed for 12 months. A pair of DIP shunts is also required to upgrade the CPU memory in the TRS-80 — these cost an additional $4.00. All kits come complete with full, step-by-step instructions which include labelled photographs. No soldering is required. You do not have to be an experienced electronic technician to instal them.

DISK DRIVE CABLES SUITABLE FOR ANY DISK DRIVES

DC-2 2 Drive Connector Cable . . . . . $39 incl. p&p
DC-4 4 Drive Connector Cable . . . . . $49 incl. p&p

DOUBLE THE SPEED AND CAPACITY OF YOUR DISK DRIVES PERCOM DOUBLER ONLY $220 plus $2.00 p&p

Installing a Doubler is like buying another set of disk drives, only much cheaper!! The doubler works with most modern disk drives including:- MPI, Micropolis, Pertec, TEAC (as supplied by Tandy). The doubler installs in the TRS-80 expansion interface, the System-80 expansion interface and the LNW Research expansion interface in a few minutes without any soldering, cutting of tracks, etc. It comes complete with its own TRSDOS compatible double density operating system.

DOUBLE-ZAP II — DOUBLE DENSITY PATCH FOR NEWDOS 80 ONLY $53.00 plus $1.00 p&p

DISCONTINUED

If you are using NEWDOS 80, then you also need DOUBLE-ZAP II on diskette. This program upgrades your NEWDOS 80 to double density with ADR (automatic density recognition). It retains all the familiar features, including the ability to mix and match track counts on the same cable. In addition, it gives NEWDOS 80 the ability to mix densities on the same cable, automatically. If you place a single density diskette in drive Ø, say and a double density diskette in drive 1, Double-ZapII will recognise this and read/write to drive Ø in single density whilst at the same time it reads/writes to drive 1 in double density!

FLOPPY DOCTOR AND MEMORY DIAGNOSTIC (by MICRO CLINIC) $29.95 plus 50c. p&p

Two machine language programs on a diskette together with manual which thoroughly test your disk drives and memory. There are 19 possible error messages in the disk drive test and their likely causes are explained in the manual. Each pass of the memory tests checks every address in RAM 520 times, including the space normally occupied by the diagnostic program itself. When an error occurs the address, expected data, and actual data are printed out together with a detailed error analysis showing the failing bit or bits, the corresponding IC's and their location. This is the most thorough test routine available for TRS-80 disk users.

BOOKS

LEVEL II ROM REFERENCE MANUAL $24.95 + $1.20 p&p

Over 70 pages packed full of useful information and sample programs. Applies to both TRS-80 and SYSTEM 80.

TRS-80 DISK AND OTHER MYSTERIES $24.95 + $1.20 p&p

The hottest selling TRS-80 book in the U.S.A. Disk file structures revealed, DOS's compared and explained, how to recover lost files, how to rebuild crashed directories — this is a must for the serious Disk user and is a perfect companion to any of the NEWDOS's.

LEARNING LEVEL II $16.95 + $1.20 p&p

Written by Daniel Lien, the author of the TRS-80 Level I Handbook, this book teaches you, step-by-step, how to get the most from your Level II machine. Invaluable supplement to either the TRS-80 Level II Manual or the System-80 Manuals.

MORE AUSTRALIAN SOFTWARE

All programs designed to run on both the TRS-80 or the SYSTEM 80 without modification. Most programs include sound

TRIAD VOL 1 – L2/16K
Cassette $10.95 Disk $15.95
+ 60c p&p

Three separate games which test your powers of memory and concentration. The programs combine graphic displays and sound:

SIMON-SEZ: Just like the electronic music puzzles on sale for more than $20. Numbers are flashed on the screen and sounded in a sequence determined by the computer. Your task is to reproduce the sequence, correctly.

LINE?: Rather like a super, complicated version of noughts and crosses. You may play against another player or against the computer itself. But beware, the computer cheats!

SUPER CONCENTRATION: Just like the card game but with more options. You must find the hidden pairs. You may play against other people, play against the computer, play on your own, or even let the '80 play on its own.

TRIAD VOL 2 – L2/16K
Cassette $10.95 Disk $15.95
+ 60c p&p

Remember those "NUMERO" puzzles in which you had a matrix of numbers (or letters) with one blank space and you had to shuffle the numbers around one at a time until you had made a particular pattern? Well, **SHUFFLEBOARD**, the first program in this triad, is just this, except that the computer counts the number of moves you take to match the pattern it has generated – so it is not possible to cheat.

MIMIC is just like SHUFFLEBOARD except that you only see the computer's pattern for a brief span at the beginning of the game, then you must remember it!

In **MATCHEM**, you have to manoeuvre 20 pegs from the centre of the screen to their respective holes in the top or bottom rows. Your score is determined by the time taken to select a peg, the route taken from the centre of the screen to the hole and your ability to direct the peg into the hole without hitting any other peg or the boundary.

VISURAMA L2/16K
Cassette $10.95 Disk $15.95
+ 60c p&p

Two programs which give fascinating, ever-changing patterns on the screen.

LIFE is the fastest implementation of the Game of Life you will see on your '80. Machine language routines create up to 1200 new generations per minute for small patterns or up to 100 per minute for the full 128 x 48 screen matrix. Features full horizontal and vertical wraparound.

EPICYCLES will fascinate you for hours. The ever-changing ever-moving patterns give a 3D effect and were inspired by the ancient Greek theories of Ptolemy and his model of the Solar system.

EDUCATION AND FUN – L1/4K, L2/16K
Cassette $10.95 Disk $15.95
+ 60c p&p

Written by a primary school teacher to make learning enjoyable for his pupils, there are five programs in both Level I and Level II to suit all systems:

BUG-A-LUG: a mathematics game, in which you must get the sum correct before you can move.

AUSTRALIAN GEOGRAPHY: learn about Australian States and towns, etc.

SUBTRACTION GAME: build a tower with correct answers.

HOW GOOD IS YOUR MATHS? Select the function (+, –, ÷ or X) and degree of difficulty.

HANGMAN: That well known word game now on your computer.

Recommended for children from 6 to 9 years.

COSMIC FIGHTER & SPACE JUNK – L2/16K
Cassette $10.95 Disk $15.95
+ 60c p&p

Both programs have sound to complement their excellent graphics. In **COSMIC FIGHTER**, you must defend the earth against seven different types of alien aircraft. It is unlikely that you will be successful but you will have a lot of fun trying!

You mission in **SPACE JUNK** is to clean up all the debris left floating around in space by those other space games. It is not as simple as it sounds and space junk can be quite dangerous unless you are very careful.

SPACE DRIVE L2/4K & 16K
Cassette $8.95 Disk $13.95
+ 60c p&p

Try to manoeuvre your space ship through the meteor storms then land it carefully at the space port without running out of fuel or crashing. Complete with realistic graphics.

STARFIRE AND NOVA INVASION L2/16K
Cassette $10.95 Disk $15.95
+ 60c p&p

Both programs include sound to improve their realism.

STARFIRE seats you in the cockpit of an X-wing fighter as you engage in battle with the deadly Darth Vader's Tie-fighters. Beware of the evil one himself and may the Force be with you.

In **NOVA INVASION**, you must protect your home planet of Hiberna from the invading NOVADIANS. You have two fixed guns at each side of the screen and a moveable one at the bottom. Apart from shooting down as many invaders as possible, you must protect your precious hoard of Vitaminium or perish!

AIR ATTACK AND NAG RACE – L2/16K
Cassette $10.95 Disk $15.95
+ 60c p&p

An unlikely combination of programs but they share the same author who has a keen sense of humour.

AIR ATTACK includes sound and realistic graphics. The aircraft even have rotating propellors! But they also drop bombs on you, so it's kill or be killed!

NAG RACE lets you pander to your gambling instinct without actually losing real money. Up to five punters can join in the fun. Each race results in a photo-finish whilst there is a visible race commentary at the bottom of the screen throughout the race. Happy punting!

FOUR LETTER MASTERMIND L2/16K
Cassette $8.95 Disk $13.95
+ 60c p&p

There are 550 four-letter words from which the computer can make its choice. You have 12 chances to enter the correct word. After each try, the computer informs you of the number of correct letters and those in the correct position. You can peek at the list of possible words but it will cost you points. Makes learning to spell fun.

MUSIC IV – L2/16K
Cassette $8.95 Disk $13.95
+ 60c p&p

Music IV is a music compiler for your '80. It allows you to compose or reproduce music with your computer that will surprise you with its range and quality. You have control over duration (full beat to 1/16 beat) with modifications to extend the duration by half or one third for triplets. Both sharps and flats are catered for as are rests. Notes on whole sections may be repeated. The program comes with sample data for a well-known tune to illustrate how it is done.

*****SAVE 00$'s ***SAVE 00$'s ***SAVE 00$'s ***MICRO-80 EXPANSION INTERFACE *****

MICRO-80's expansion interface utilises the proven LNW Research Expansion board. It is supplied fully built up and tested in an attractive cabinet with a self contained power supply, ready to plug in and go. The expansion interface carries MICRO-80's full, no hassle, 90-day warranty.

Features include:- • Sockets for up to 32K of memory expansion • Disk controller for up to 4 disk drives • Parallel printer port • Serial RS232C/20mA I/O port • Second cassette (optional)

The expansion interface connects directly to your TRS-80 L2/16K keyboard or, via SYSPAND-80 to your SYSTEM-80VIDEO GENIE

Prices: HD-010-A Expansion Interfaces with Ø K : $499.00 HD-010-B Expansion Interfaces with 32K : $549.00 HD-011 Data separator fitted (recommended) : add $29.00 HD-012 Dual cassette Interfaces fitted : add $19.00

The MICRO-80 Expansion Interface is also available in kit form.

Prices: HD-013 Kit consisting of LNW Research PC board and manual, ALL components including cabinet & power supply : $375.00 HD-011 Data separator for above $25.00 HD-013 Dual cassette Interface kit : $15.00

TURN THIS into this

for $49.00 plus $2.00 p & p

A choice of upper and lower case display is easier to read, gives greater versatility.

The Micro-80 lower case modification gives you this facility, plus the symbols for the 4 playing-card suits for $49.00 + $2.00 p. & p.

The Micro-80 modification features true below-the-line descenders and a block cursor.

Each kit comes with comprehensive fitting instructions and two universal lower-case drive routines on cassette to enable you to display lower case in BASIC programs.

The driver routines are self-relocating, self-protecting and will co-reside with other machine language programs such as Keyboard-debounce, serial interface driver programs etc.

Both programs give your TRS-80™ Model I or System 80™ an optional typewriter capability, i.e. shift for upper case.

The second programme also includes Keyboard-debounce and a flashing cursor.

You fit it. Or we can.

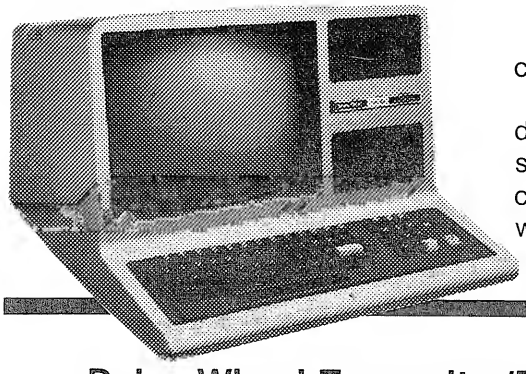
Fitting the modification requires soldering inside the computer. This should only be carried out by an experienced hobbyist or technician.

If you are at all dubious, a fitting service is available in all capital cities for only $20.00.

A list of installers is included with each kit.

Save $120 now.

ADD A DISK DRIVE TO YOUR TRS-80™ MODEL III FOR ONLY $875.00 OR ADD TWO FOR ONLY $1199.



The Micro-80 disk drive upgrade for the TRS-80™ Model III contains the following high quality components:

1 or 2 MPI 40-track single head disk drives, 1 VR Data double-density disk controller board and 1 dual drive power supply plus all the necessary mounting hardware, cables and comprehensive fitting instructions, which can be carried out with a minimum of fuss by any average computer owner.

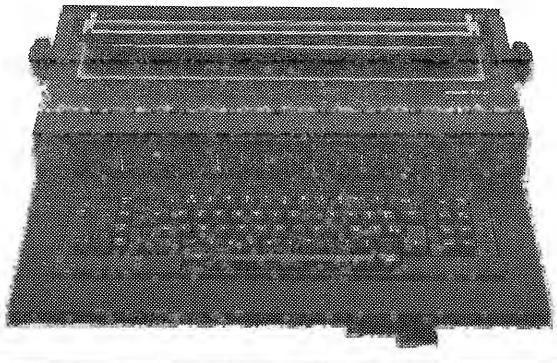
Fitting service is available for $25.00 in most capital cities.

Daisy Wheel Typewriter/Printer

ONLY $2049 INC. S.T.

MICRO-80 has converted the new OLIVETTI ET-121 DAISY WHEEL typewriter to work with the TRS-80 and SYSTEM 80 or any other microcomputer with a Centronics parallel port (RS 232 serial interface available shortly). The ET-121 typewriter is renowned for its high quality, fast speed (17 c.p.s.), quietness and reliability. MICRO-80 is renowned for its knowledge of the TRS-80/SYSTEM 80 and its sensible pricing policy. Together, we have produced a dual-purpose machine:- an attractive, modern, correcting typewriter which doubles as a correspondence quality Daisy-wheel printer when used with your micro-computer.

How good is it? - This part of our advertisement was typeset using an ET-121 driven by a TRS-80. Write and ask for full details.



*** NEW IMPORTED SOFTWARE ***

FOR TRS-80 MODELS I & III FROM THE CORNSOFT GROUP

SCARFMAN an AMAZEing game known in the arcades as Ghostmuncher or Pacman. This is by far the best implementation of this thrilling arcade game that we have seen on the TRS-80. It comes complete with realistic sounds, fast action and nine levels of play. SCARFMAN will support the use of Alpha Products Joysticks.

MODEL I & III TAPE $16-95 + 60¢ p&p

MODEL I DISK $22-95 + 60¢ p&p

MODEL III DISK $22-95 + 60¢ p&p

ENHBAS $59-95 + $1-00 p&p
MODEL I DISK OR CASSETTE, MODEL III DISK OR CASSETTE (Specify)

Short for ENHANCED BASIC, ENHBAS adds over 30 new commands and functions to your BASIC interpreter.

SORTING COMMANDS

Sorts 1000 strings in less than 10 seconds! - without Microsoft's garbage collection delays. Call up to 14 keys and tags in one sort.

BRANCHING COMMANDS

Label BASIC lines then branch to them via the new GTO or GSUB statements. Makes for modular self-documenting programs. RESTORE to a data statement at any line number or label. POP eliminates the last return from a sub-routine call. WHILE-WEND allows you to produce structured programs.

GRAPHIC/SCREEN CONTROL

SCROLL, LEFT, INVERT, DRAW and PLOT. SCROLL, keeps the number of lines commanded from being rolled off the top. LEFT, moves the whole screen over one character to the left. INVERT, why not RESET all of those SET points, and SET all the RESET points in one command, and while it works, non-graphic blocks are uneffected. DRAW and PLOT makes games and graphs easier to create. DRAW uses a "shape table" which tells the command which direction, how far and how to draw (SET or RESET). DRAW allows the use of SCALE (how big) and ROT (rotate the picture in 45° increments) to help animate those pictures. PLOT makes line and box drawing a one line command (no loops with SETs and RESETs).

OTHER COMMANDS

Single step through BASIC programs with ZSTEP! SOUND gives you a key click, PLAY allows you to control the pitch and length of tones generated by your computer through the cassette port. EXEC enables you to EXECute a string. EVAL evaluates a variable, directly. WPEEK and WPOKE are 16 bit equivalents to PEEK and POKE. WINKEY$ does an INKEY$ but sits put until any key is pressed. A series of other commands give you control over line length and page length of your printer while CALL enables you to call machine language routines from your BASIC program.

HARD DISK - OVER 5 Megabyte STORAGE FOR YOUR MODEL III !!

ONLY $2995*

Now, for the first time in Australia, MICRO-80 is able to offer the ACT Micro-Winchester hard disk storage sub-system for the TRS-80 Model III microcomputer. The ACT is a completely self-contained unit in a small attractive cabinet. It includes a 5Mbyte 5¼ inch Winchester technology, hard disk drive, an ACT controller card with HOP high integrity data separator, power supply, a Model III interface card and cable and CP/M 2.2 (org 4200 or org Ø) disk operating system. In short, it is a complete, stand-alone unit which simply plugs on to the 50 way expansion bus on your Model III. There are absolutely no modifications made to your computer and the Tandy warranty is not effected in any way. The minimum system requirements are a 48K single disk drive TRS-80 Model III microcomputer. ACT offers the following unique advantages:

- ultra fast disk access time (5 million bits per second burst speed)
- ultra high reliability writing and reading of data
- enormous storage capacity (equivalent to almost 28 standard floppy disk drives)
- access to the very wide range of high quality CP/M applications software (standard Model III requires org 4200 Hex programs)
- quiet, reliable operation
- local service and design backup. ACT started in the U.S.A. but is now an Australian owned company based in Sydney.

Coming soon, DOSPLUS 4.0 for your ACT Micro-Winchester.

Now your TRS-80 Model III can be a serious business computer at a fraction of the cost of other brands with similar specifications.

Want an ACT Micro-Winchester on your disk-based Model I or System 80? It could be done but we need to gauge the interest. Write to us to let us know that you would be seriously interested.

* Price is F.O.B. Adelaide. Add $15 road freight anywhere in Australia.

THIS MONTH'S SPECIALS

ET121 TYPEWRITER/PRINTERS ONLY $1500*

Electronics are great, prices keep coming down, not going up. The regular price for our ET121 Electronic Daisywheel typewriter/printer is down to $1750. But we are overstocked so for a short time we are reducing the price to only $1500. This is for the standard ET121 with the MICRO-80 parallel interface. The ET121 is a heavy duty, full-sized (15" carriage) electronic typewriter. With an interface it operates as a correspondence quality printer driven by your computer. If you have been contemplating purchasing one of these machines, now is the time to act, you will not find better value for money anywhere.

* Price is F.O.B. Adelaide, add $20 road freight anywhere in Australia. Cable from TRS-80/SYSTEM 80 printer port to printer $39-00. The typewriter/printer requires the use of an expansion interface, Syspand 80 (on the System 80) or Tandy printer cable.

MICROPOLIS 77 TRACK DISK DRIVE ONLY $499*

One only left in stock. Normally sells at $649-00, this a brand new 77 track MICROPOLIS disk drive complete with cabinet and power supply. We are rationalizing our product lines and will no longer stock these units. (Full service and spares will continue to be available).

* Price is F.O.B. Adelaide, add $10 road freight anywhere in Australia.

DOSPLUS - THE NO-FUSS POWERFUL DISK OPERATING SYSTEM FOR MODEL I OR III

Until DOSPLUS came along you had only two choices. Use TRSDOS which was slow, full of bugs but very widely used, or use NEWDOS 80 which was powerful, fast, had a few bugs, but these were corrected periodically by user-installed zaps but was intended as an experienced programmers DOS and took a lot of study and understanding. If you wanted to take advantage of advancing technology in disk drives, then you had no choice - NEWDOS 80 was the only serious DOS to support dual-head or 80 track disk drives. Make no mistake, NEWDOS 80 is a great DOS but it does take quite a bit of driving and in the Model III in particular, is almost incompatible with TRSDOS.

Then came DOSPLUS 3.3. MICRO-SYSTEMS SOFTWARE, the authors, offered a $100 reward for each genuine bug reported in DOSPLUS 3.3. Over a period of 12 months, they paid out only 5 times! DOSPLUS 3.3 is still current and is an excellent Operating System for those who want a straight-forward, fuss-free DOS using single head disk drives of any track count. There is a high degree of compatibility with TRSDOS. 80 MICROCOMPUTING reports that DOSPLUS 3.3 Double Density is the only serious Double Density Operating System for the Model I.

Now we also have DOSPLUS 3.4. DOSPLUS 3.4 supports dual head disk drives of any track count or stepping speed. It also supports 8" disk drives (with suitable hardware). The following are just a few of the many features available:

- BASIC array sort - multi key, multi array
- Input @ (controlled screen input)
- BASIC checks for active "DO"
- Much improved Backup (more reliable)
- Repeat last DOS command with "/" ENTER
- Short directory of Model 3 TRSDOS disks
- COMPLETE device routing supported (DOS and BASIC)
- Includes the new DOSPLUS Z80 disk BASIC version 1.6
- RESTORE dead files
- CLEARFILE (destroys data by writing zeros to file)
- SPOOLER (allows printing of text while freeing up the CPU)
- Tape/Disk - Disk/Tape utility (with relocator)
- Random access and ASCII modification on Diskdump
- Backup and Format from a "DO" file
- I/O package much faster (disk access time reduced)
- Short directory (file name and extension) available
- Single file convert from Model 3 TRSDOS
- Ability to save BASIC programs directly to another machines' memory (if equipped with DOSPLUS 3.4)
- Single drive copy utility
- PURGE (unwanted files)
- TRANSFER (moves all user files from one disk to another)
- CRUNCH (BASIC program compressor)

And all this in a simple, easy-to-use package supported by a 200 plus page User's Guide. We have ALL versions of DOSPLUS in stock now! Specify the version you require and whether you need it on a 35, 40 or 80 track disk.

DOSPLUS 3.3 $99-95 incl. p&p

Specify: - MODEL 1 - SINGLE DENSITY
- MODEL 1 - DOUBLE DENSITY
- MODEL 3

DOSPLUS 3.4 $149-95 incl. p&p

Specify: - MODEL 1 - SINGLE DENSITY
- MODEL 1 - DOUBLE DENSITY
- MODEL 3

****
*
*
* P R I N T E R P R I C E B R E A K T H R O U G H ! !
*
*
*
* STAR DOT MATRIX PRINTER ONLY *$625
*
*
****

The STAR dot Matrix Printer has the following features:

- 80 character per second print speed
- bi-directional printing
- Logical seeking of shortest print path
- Three print widths:

Standard	80	characters per line
Compressed	132	characters per line
Expanded	40	characters per line

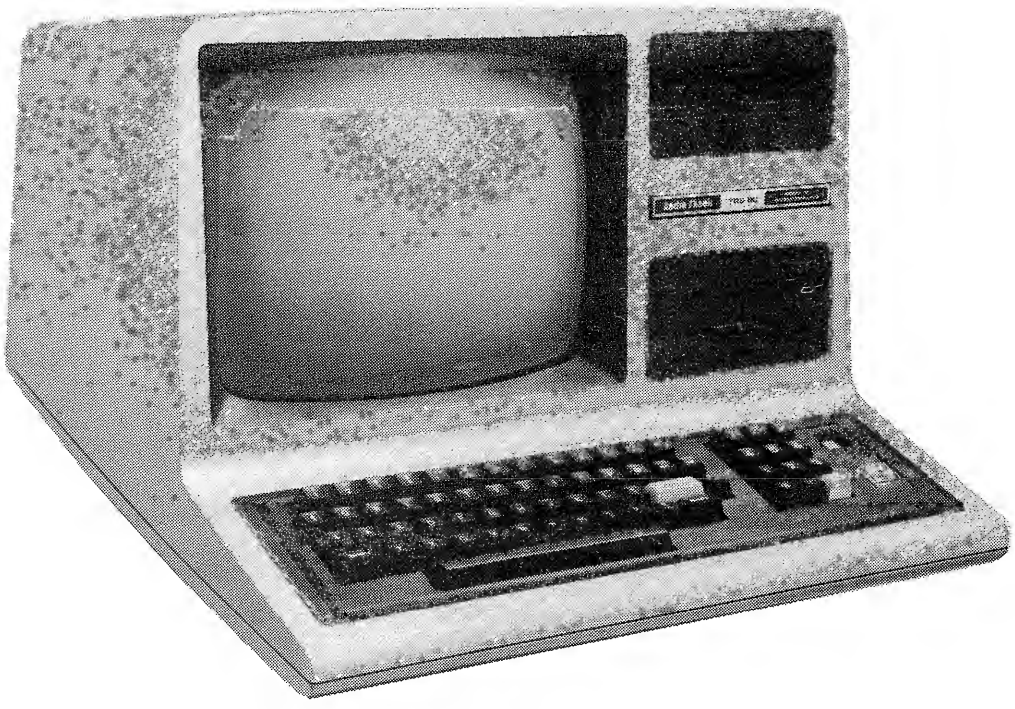
- Friction AND Tractor feed included
- Adjustable paper width from 4 - 9 inches
- 9 wire print head
- 9 x 7 high quality character formation
- Lower case
- Block graphics
- 3 line spacings - software selectable
- Centronics parallel port. (RS232 serial optional)
- Self test facility

This page was typeset using the Star printer driven by a Model III TRS-80.

* Price is F.O.B. Adelaide add $15.00 road freight anywhere in Australia.

Cable from TRS-80/System 80 printer port to printer $39.00 (The printer requires the use of an expansion interface. SYSPAND 80 (on the System 80) or printer cable.

1.4 MEGABYTES ON LINE + 48K RAM
for $3800 incl. Sales Tax



MICRO-80's
MODEL 380 +

MICRO-80 has equipped the TRS-80 with two high reliability dual-head 80 track mini-floppy disk drives made by MPI, one of America's leading mini-disk drive manufacturers.

This turns the mild-mannered Model 3 into a powerhouse able to handle the most difficult business programs. The TRS-80 is one of the best-supported microcomputers in the world. MICRO-80 has been supporting the TRS-80 in Australia for 18 months and is one of Australia's leading dealers in MPI disk drives.

2.8 MEGABYTES FOR $5300 incl. Sales Tax

If you need even more file space you can add MICRO-80's external dual-drive cabinet enclosing two more dual-head 80 track drives for an additional $1500.

COMPUTER PRICES

MODEL 340
2 40 TRACK SINGLE HEAD DRIVES GIVING
350K FORMATTED STORAGE, 48K RAM — $2990 INCL. SALES TAX

MODEL 340 +
2 40 TRACK DUAL-HEAD DRIVES GIVING
700K FORMATTED STORAGE, 48K RAM — $3350 INCL. SALES TAX

MODEL 380
2 80 TRACK SINGLE HEAD DRIVES GIVING
700K FORMATTED STORAGE, 48K RAM — $3350 INCL. SALES TAX

MODEL 380 +
2 80 TRACK DUAL-HEAD DRIVES GIVING
1.4 MEGABYTE FORMATTED STORAGE, 48K RAM — $3800 INCL. SALES TAX

350K SYSTEM
MODEL 340, EPSON MX-80 PRINTER
NEWDOS 80 DISK OPERATING SYSTEM — $4070 INCL. SALES TAX

700K SYSTEM (40 Track)
MODEL 340 +, EPSON MX-80 PRINTER
NEWDOS 80 DISK OPERATING SYSTEM — $4429 INCL. SALES TAX

700K SYSTEM (80 Track)
MODEL 380, EPSON MX-80 PRINTER
NEWDOS 80 DISK OPERATING SYSTEM — $4429 INCL. SALES TAX

1.4 MEGABYTE SYSTEM
MODEL 380 +, EPSON MX-80 PRINTER
NEWDOS 80 OPERATING SYSTEM — $4880 INCL. SALES TAX

2.8 MEGABYTE SYSTEM
MODEL 380 +, DUAL EXTERNAL DRIVES,
MX-80 PRINTER, NEWDOS 80 OPERATING SYSTEM — $6380 INCL. SALES TAX

EXATRON STRINGY FLOPPY — $372.50 Incl. P&P

All Exatron Stringy Floppies sold by MICRO-80 include the special chained version of **HOUSEHOLD ACCOUNTS,** developed by Charlie Bartlett. When used on the ESF, this program is powerful enough to perform many of the accounting functions in a small business. Remember, the ESF comes complete with a comprehensive manual, a 2 way bus-extender cable, its own power supply and 10 wafers of mixed length. One wafer contains the Data Input/Output program and another the **HOUSEHOLD ACCOUNTS** program.

CAN'T MAKE UP YOUR MIND ABOUT THE ESF?

Then send in $5.00 for a copy of the manual. We will refund your $5.00 IN FULL when you purchase an ESF.

All prices subject to change without notice. Prices are F.O.B. Adelaide. All computers and systems carry MICRO-80's 90-day Warranty covering parts and labour.

SOFTWARE BY AUSTRALIAN AUTHORS

All our software is suitable for either the SYSTEM 80 or the TRS-80

NEW SOFTWARE FROM MICRO-80 PRODUCTS

BUSINESS PROGRAMS

MICROMANAGEMENT STOCK RECORDING SYSTEM (L2/16K)

Cassette version. . . . . $29.95 + $1.00 p&p
Stringy Floppy version. . . . . $33.95 + $1.00 p&p

This system has been in use for 9 months in a number of small retail businesses in Adelaide. It is therefore thoroughly debugged and has been tailor made to suit the requirements of a small business. MICROMANAGEMENT SRC enables you to monitor the current stock level and reorder levels of 500 different stock items per tape or wafer. It includes the following features:—

- Add new items to inventory
- Delete discontinued items from inventory
- List complete file
- Search for any stock number
- Save data to cassette or wafer
- Load data from cassette or wafer
- Adjusts stock levels from sales results and receipt of goods
- List all items requiring reordering

We can thoroughly recommend this program for the small business with a L2/16K computer.

SCOTCH BRAND COMPUTING CASSETTES

Super-quality personal computing cassettes.
C-10 pack of 10 ... ... $26.00 incl. p&p
C-30 pack of 10 ... ... $28.00 incl. p&p

UTILITIES

S-KEY by Edwin Paay $15.95 plus 50c. p&p

S-KEY is a complete keyboard driver routine for the TRS-80 and becomes part of the Level II basic interpreter. With S-KEY loaded the user will have many new features not available with the standard machine.

S-KEY features:

* S-KEY provides an auto-repeat for all the keys on the keyboard. If any key is held down longer than about half a second, the key will repeat until it is released.
* Graphic symbols can be typed direct from the keyboard, this includes all 64 graphic symbols available from the TRS-80/SYSTEM 80.
* S-KEY allows text, BASIC commands and/or graphics to be defined to shifted keys. This makes programming much easier as whole commands and statements can be recalled by typing shift and a letter key.
* Because S-KEY allows graphics to be typed directly from the keyboard, animation and fast graphics are easily implemented by typing the appropriate graphics symbols directly into PRINT statements.
* S-KEY allows the user to LIST a program with PRINT statements containing graphics, properly. S-KEY does this by intercepting the LIST routine when necessary.
* S-KEY allows the user to list an updated list of the shift key entries to the video display or line printer.
* S-KEY can be disabled and enabled when required. This allows other routines which take control of the keyboard to run with S-KEY as well.

Each cassette has TRS-80, DISK and SYSTEM 80 versions and comes with comprehensive documentation.

BMON by Edwin Paay $19.95 plus 50c. p&p
THE ULTIMATE HIGH MEMORY BASIC MONITOR L2/16-48K

Our own personnel refuse to write BASIC without first loading this amazing machine language utility program into high memory! BMON Renumbers; Displays BASIC programs on the screen while they are still loading; tells you the memory locations of the program just loaded; lets you stop a load part-way through; merges two programs, with automatic renumbering of the second so as to prevent any clashes of line numbers; recovers your program even though you did type NEW: makes one program invisible while you work on a second (saves hours of cassette time!); lists all the variables used in the program; makes SYSTEM tapes; lets you Edit memory directly . . . the list goes on and on. Cassette comes with 16K, 32K and 48K versions, ready to load. Can anyone afford NOT to have BMON?

EDUCATIONAL

RPN CALCULATOR (L2/16K & 32K)
$14.95 $ 50c. p&p

Give your computer the power of a $650 reverse polish notation calculator with 45 functions and selectable accuracy of 8 or 16 digits. The main stack and registers are continuously displayed whilst the menu is always instantly accessible without disturbing any calculations or register values. The cassette comes with both the 16K and 32K versions, the latter giving you the additional power of a programmable calculator. Comes with a very comprehensive 15 page manual, which includes instructions to load and modify the 32K programmable version to run in 16K. Whether for business or pleasure, this package will prove invaluable, and turn you '80 into a very powerful instrument.

GAMES

MICROPOLY (L2/16K) $8.95 + 60c p&p

Now you can play Monopoly on your micro. The old favourite board game has moved into the electronic era. This computer version displays the board on the screen, obeys all the rules and, best of all, the banker does not make mistakes with your change!

CONCENTRATION (L2/16K) $8.95 + 60c p&p

Another application of supergraphics. There are 28 "cards" displayed on the screen, face down. Players take it in turn to turn them over with the object of finding matching pairs. There are 40 different patterns which are chosen at random, so the game is full of endless variety. This is of particular value in helping young children to learn the art of concentrating and, at the same time, to introduce them to the computer.

METEOR AND TORPEDO ALLEY (L2/16K)
$10.95 + 60c p&p

Those who frequent games arcades will recognize these two electronic games. In METEOR you must destroy the enemy space ships before they see you. In its most difficult mode, the odds are a thumping 238 to 1 against you being successful. In torpedo alley you must sink the enemy ships without hitting your own supply ship. Both games include sound effects and are remarkably accurate reproductions of the arcade games.

AUSTRALIAN SOFTWARE (Cont.)

GAMES

SHEEPDOG (L2/16K) **$8.95 + 60c p&p**

Ever wondered how a sheepdog manages to drive all those awkward sheep into a pen? Well, here is your chance to find out just how difficult it is and have a lot of fun at the same time. You control the sheepdog, the computer controls the sheep! As if that isn't enough, look out for the dingoes lurking in the bush!

U BOAT **$8.95 + 60c p&p**

Real time simulation at its best! Comes with working sonar-screen and periscope, a full rack of torpedoes, plenty of targets, working fuel and battery meters, helpful Mothership for high-seas reprovisioning and even has emergency radio for that terrible moment when the depth charges put your crew at risk. Requires Level II/16K.

SPACE INVADERS WITH SOUND **$8.95 + 60c p&p**

Much improved version of this arcade favourite with redesigned laser and cannon blasts, high-speed cannon, 50 roving drone targets, 10 motherships and heaps of fun for all. Level II with 4K and 16K versions on this cassette.

GOLF (L2/16K) **$8.95 + 60c p&p**

Pit your skills of mini-golf against the computer. Choose the level of difficulty, the number of holes and whether you want to play straight mini golf or crazy golf. Complete with hazards, water traps, bunkers and trees. Great fun for kids of all ages.

DOMINOES(L2/16K) **$8.95 + 60c p&p**

Pit your skill at dominoes against the computer, which provides a tireless opponent. Another application of supergraphics from the stable of Charlie Bartlett. Dominoes are shown approximately life size in full detail (except for colour!). The monitor screen is a window which you can move from one end of the string of dominoes to the other. Best of all, you don't lose any pieces between games!

KID'S STUFF (formerly MMM-1) **$8.95 + 60c p&p**

Three games on one cassette from that master of TRS-80 graphics, Charlie Bartlett. Includes INDY 500, an exciting road race that gets faster and faster the longer you play, SUBHUNT in which your warship blows up unfortunate little submarines all over the place, and KNIEVEL (as in motorcycle, ramp and buses).

OTHER PROGRAMS

INFINITE BASIC BY RACET (32K/1 DISK)
$49.95 + 50c. p&p

Full matrix functions – 30 BASIC commands; 50 more STRING functions as BASIC commands.

GSF/L2/48K **$24.95 + 50c. p&p**

18 machine language routines including RACET sorts.

BUSINESS ADDRESS AND INFORMATION SYSTEM (48K/DISK) **$24.95 + 50c. p&p**

Allows you to store addresses and information about businesses, edit them and print them out.

HISPED (L216, 32 or 48K) $29.95

This machine language program allows you to SAVE and LOAD programs and data to tape at speeds up to 2000 band (4 times normal) using a standard cassette recorder. A switch must be installed to remove the XRX III loading board, if fitted.

LOWER CASE FOR YOUR TRS-80/SYSTEM 80
Kit only $49.00 plus $2.00 p&p

Give your TRS-80 or SYSTEM 80 a lower case display with proper descenders and a block cursor (similar to the TRS-80 Model III). Also includes symbols for the four suits of cards. Includes full fitting instructions, all necessary components and a special machine language driver program to enable lower case in BASIC. The modification is similar to the Tandy model and does not work with Electric Pencil without further modifications.

These kits require disassembly of your computer and some soldering. They should only be installed by someone who has experience in soldering integrated circuits, using a low power, properly earthed soldering iron. If you do not have the necessary experience/equipment, we will install the modification for you for $20 plus freight in both directions. Make sure you arrange the installation with us first, before despatching your computer, so that we can assure you of a rapid turn-around. We are also arranging to have installers in each State. See elsewhere in this issue for their names and addresses.

PRICES

Cat No.
HD-020 Lower case mod kit for TRS-80
$49.00 plus $2.00 p&p
HD-021 Lower case mod kit for SYSTEM-80
$49.00 plus $2.00 p&p

EPSON MX-80 PRINTER
ONLY *$949 Inc. Cable for TRS-80 and p&p
(*Printer only – $940 incl. p&p)

The EPSON MX-80 printer is compact, quiet, has features unheard of only 2-3 years ago in a printer at any price and, above all, is ultra-reliable. All available print modes may be selected under software control. Features include:

- high quality 9x9 dot-matrix character formation
- 3 character densities
  - 80 characters per line at 10 chars/inch
  - 132 characters per line at 16.5 chars/inch
  - 40 characters per line at 5 chars/inch
- 2 line spacings
  - 6 lines per inch 8 lines per inch
- 80 characters per second print speed
- bi-directional printing
- logical seeking of shortest path for printing
- lower case with descenders
- TRS-80 graphics characters built in
- standard Centronics printer port

The bi-directional printing coupled with the logical seeking of the shortest print path (which means that the print head will commence printing the next line from the end which requires the least travel, thereby minimising unutilised time) gives this printer a much higher throughput rate than many other printers quoting print speeds of 120 c.p.s. or even higher.

GREEN SCREEN SIMULATOR
$9.50 incl. p&p

The GREEN SCREEN SIMULATOR is made from a deep green perspex, cut to fit your monitor. It improves contrast and is much more restful to the eyes than the normal grey and white image.

All editorial staff of MICRO-80 are now using GREEN SCREEN SIMULATORS on their own monitors.

Please make sure to specify whether you have an old (squarish) or new (rounded) style monitor when ordering. Not available for Dick Smith monitors.

```
1860 K=K-1:M=M-1:P=176:Q=131:GOSUB1790:K=K+63:M=M-65:P=131:Q=176
:GOSUB1790:K=K-1:M=M-1:P=140:Q=P:GOSUB1790
1870 K=K-1:M=M-1:P=176:Q=131:GOSUB1790
1880 K=K+63:M=M-65:P=131:Q=176:GOSUB1790
1890 K=K-1:M=M-1:P=140:Q=P:GOSUB1790
1900 K=K-1:M=M-1:P=176:Q=131:GOSUB1790
1910 GOTO 1960
1920 FORI=299 TO 306
1930 POKEVV+I,131
1940 POKEVV+I+512,176
1950 NEXTI
1960 FORI=272 TO 784 STEP 64
1970 POKEVV+I,191
1980 POKEVV+I+26,191
1990 NEXTI
2000 IF E=0 RETURN
2010 FOR I=273 TO 297
2020 POKEVV+I,131
2030 POKEVV+I+512,176
2040 NEXTI
2050 RETURN
2060 REM DEPTH 3
2070 IFC=0THEN 2120
2080 K=273:M=785:P=140:Q=P:GOSUB1790:K=K+1:M=M+1:P=176:Q=131:GOS
UB 1790
2090 K=K+65:M=M-63:P=131:Q=176:GOSUB1790:K=K+1:M=M+1:P=140:Q=140
:GOSUB1790
2100 K=K+1:M=M+1:P=176:Q=131:GOSUB1790
2110 GOTO 2160
2120 FORI=401 TO 405
2130 POKEVV+I,131
2140 POKEVV+I+256,176
2150 NEXTI
2160 IFD=0THEN 2220
2170 K=297:M=809:P=140:Q=140:GOSUB1790
2180 K=K-1:M=M-1:P=176:Q=131:GOSUB1790
2190 K=K+63:M=M-65:P=131:Q=176:GOSUB1790
2200 K=K-1:M=M-1:P=140:Q=140:GOSUB1790:K=K-1:M=M-1:P=176:Q=131:G
OSUB1790
2210 GOTO 2260
2220 FORI=421TO425
2230 POKEVV+I,131
2240 POKEVV+I+256,176
2250 NEXTI
2260 FORI=406 TO 666 STEP 64
2270 POKEVV+I,191
2280 POKEVV+I+14,191
2290 NEXTI
2300 IF E=0 RETURN
2310 FORI=407 TO419
2320 POKEVV+I,131
2330 POKEVV+I+256,176
2340 NEXTI
2350 RETURN
2360 REM DEPTH 4
2370 IF C=0 THEN 2410
2380 K=407:M=663:P=140:Q=140:GOSUB1790:K=K+1:M=M+1:P=176:Q=131:G
OSUB1790
2390 K=K+65:M=M-63:P=131:Q=176:GOSUB1790
2400 GOTO 2430
2410 K=471:M=599:P=140:Q=140:GOSUB1790:K=K+1:M=M+1:GOSUB1790
2420 K=K+1:M=M+1:GOSUB1790
2430 IFD=0THEN 2470
2440 K=419:M=675:P=140:Q=140:GOSUB1790:K=K-1:M=M-1:P=176:Q=131:G
OSUB1790
2450 K=K+63:M=M-65:P=131:Q=176:GOSUB1790
2460 GOTO 2490
2470 K=481:M=609:P=140:Q=140:GOSUB1790:K=K+1:M=M+1:GOSUB1790
2480 K=K+1:M=M+1:GOSUB1790
2490 K=474:M=480:P=188:Q=188:GOSUB1790
2500 K=K+64:M=M+64:P=191:Q=191:GOSUB1790
2510 K=K+64:M=M+64:P=143:Q=143:GOSUB1790
2520 IF E=0 RETURN
2530 FORI=475TO479
2540 POKEVV+I,140
2550 POKEVV+I+128,140
2560 NEXTI
```

```
2570 RETURN
2580 REM DEPTH 5
2590 IFC=0GOTO 2630
2600 POKEVV+475,176
2610 POKEVV+603,131
2620 GOTO 2640
2630 POKEVV+539,179
2640 IFD=0 GOTO 2680
2650 POKEVV+479,176
2660 POKEVV+607,131
2670 GOTO 2690
2680 POKEVV+543,179
2690 POKE VV+540,191
2700 POKEVV+542,191
2710 IF E=0 RETURN
2720 POKEVV+541,179
2730 RETURN
2740 PRINT@468,"WAY OUT";
2750 END
2760 REM INSTRUCTIONS AND TITLE
2770 PRINT@980,"* * * * * * * * * *"
2780 PRINT@980,"  T H E   M A Z E "
2790 PRINT@980,"* * * * * * * * * *"
2800 PRINT:RETURN
2810 PRINT"YOU WILL BE PLACED AT A POINT IN A TEN BY TEN CELL MA
ZE AND HAVETO FIND THE WAY OUT. YOUR SCORE WILL BE CALCULATED ON
THE NUMBER OF LOOKS AND MOVES YOU MAKE."
2820 PRINT"YOU CAN ASK FOR A PLAN AT ANY TIME IF YOU GET STUCK B
UT THIS    WILL REDUCE YOUR SCORE CONSIDERABLY."
2830 PRINT:PRINT"YOU CAN TURN LEFT BY PRESSING 'L'
                        AND RIGHT BY PRESSING 'R'"
2840 PRINT"YOU MOVE FOREWORD BY PRESSSING 'F'"
2850 PRINT"GET HELP BY PRESSING 'H' - (REDUCES SCORE !!)"
2860 PRINT:PRINT"        MAKING MAZE - PLEASE WAIT A MOMENT":RET
URN
```

***** BASIC + LABELS LII/48K . - by R.T. Worley *****

Those of us who program in BASIC probably believe that it is very tedious to program in machine language, and so it would be, if programmers' aids such as editor/assemblers had not been developed. Such aids are now so advanced that they provide features superior to those available to BASIC programmers. One of the most useful features of an editor/assembler is the ability to attach LABELS to routines and jump to those LABELS from other parts of the program. The concept is somewhat like GOTO in BASIC with one major and significant difference. Whereas with GOTO it is necessary to nominate the BASIC line number to which you wish program flow to pass, this is not the case with an editor/assembler. The LABEL itself uniquely identifies the routine and the Assembler places the corresponding code in the appropriate place in memory and then automatically sets correct Jump addresses throughout the program. This makes for structured programs which do not jump about all over the place and, if meaningful Labels are used, the source code is largely self-documenting.

BASIC + LABELS now offers the BASIC programmer a similar facility - with this 1.8K machine language program loaded in high memory, you may assign Labels to sections of your BASIC program. The ml. program will then "compile" your program into BASIC code which can be RUN by the standard BASIC interpreter. The version produced here is for a 48K machine and resides from F72ØH (63264) to FE42H (65Ø9Ø). If you enter the source code into an Editor/Assembler you may alter the program for different memory sizes by changing line 5Ø. Use BASEPR EQU ØB7ØØH for a 32K machine and BASEPR EQU 77ØØH for a 16K machine. The object code supplied on the monthly cassette is for 16K machines, whilst that on disk is for 48K machines.

BASIC + LABELS now offers the BASIC programmer a similar facility - with this 1.8K machine language program loaded in high memory, you may assign Labels to sections of your BASIC program. The ml.program will then "compile" your program into BASIC code which can be RUN by the standard BASIC interpreter. The hex listing produced here is for a 16K machine and resides from 772ØH to 7F4ØH. Unfortunately, the well commented source code is too long to reproduce in the magazine but is provided on the monthly cassette and disk. The cassette also contains the 16K object code whilst the disk contains the 48K object code. Any reader who requires a hard copy listing of the source code may obtain a photo copy by sending $5-00 to MICRO-80, P.O. BOX 213, GOODWOOD, S.A. 5034. The line number references in the following text refer to the source code. The program may be assembled for different memory sizes by changing line 5Ø. Use BASEPR EQU ØB7ØØH for a 32K machine and BASEPR EQU 77ØØH for a 16K machine.

USING BASIC + LABELS.

There are three main functions available to the user:

- Renumbering
- Deleting REM lines
- Label handling.

1. Renumbering.

The renumber command resequences the entire BASIC program in memory using any specified starting number and any specified step (1-255).

All lines with first character REM (as a token) will be given numbers, either:

(i) a multiple of 10 times the step, or
(ii) such that the next line will be a multiple of 10 times the step.

Either option may be chosen. The second option is so that sections of program will stand out (because of their line numbers) even when REM lines are deleted. Please note that the use of ' in place of REM does not produce a line with first character REM (in fact, it is coded as : followed by REM followed by ' and so wastes memory!)

Line numbers following THEN, ELSE, RESUME, (ON...)GOTO, and (ON...)GOSUB are updated during resequencing.

2. Deleting REM lines.

This deletes all REM lines, i.e. all lines which have first character REM (as a token). The note in paragraph 2 above applies.

3. Label handling.

As well as resequencing as described in section 1, this replaces label in branch statements by the corresponding line number, and moves blocks of program about as specified by labels.

A branch label heading consists of <*label*> where "label" may be any alphanumeric characters. Blanks in labels are ignored. The following illustrates the use of labels in branch statements.

```
100 GOTO <*FRED*>          100 GOTO 260
     :              ==>         :
250 <*FRED*>               250 REM*FRED*>
260  :                     260  :
```

Note that the branch is to the line after the heading label, that the heading label has been turned into a REM line that may be deleted, and that comments may follow a heading label (line 25Ø) since the rest of the line is ignored. A label reference (as in line 1ØØ) may be used in place of a line number after THEN, ELSE, GOTO, GOSUB, and RESUME. The use of ON var GOTO <*label1*> , <*label2*> etc. is allowed. There is a limit on the number of label headings that can be used. This is 98 and is determined by the size of a table (lines 8Ø85 and 919Ø).

A program block move requires three labels -

(i) a label heading <*label*> marking the start of the block to be moved;
(ii) an end label <*ENDlabel*> marking the end of the block to be moved; and
(iii) an insertion label <*LOClabel*> marking the point in the program for insertion of the block.

The following example illustrates the use.

```
 90  :                      90  :
100 <*BILL*>               170  :
110  :                      :
 :                  ==>    250  :
150  :                     110 REM*BILL*>
160 <*ENDBILL*>            110  :
170  :                      :
 :                         150  :
250  :                     270  :
260 <*LOCBILL*>             :
270  :
 :
```

Of course, the line numbers will be altered to correct sequence numbers. Note that the lines 16Ø and 26Ø are deleted, and that line 1ØØ has been turned into a REM line. Also note that anything following the label in line 1ØØ will be ignored.

Since programs making frequent calls to subroutines work fastest when the subroutine is located as near the beginning of the program as possible (or, in the case of the TRS-80, when they closely follow the point from whence they are called), a special block move instruction is available. If the block header label is of the form <*GOSUBlabel*> and the end of block marker is, correspondingly, <*ENDGOSUBlabel*> then the block is moved to the beginning of the program.

To preserve program flow in case a <*GOSUBlabel*> is used, an initial line is added to the program at the front. The following illustrates the use of <*GOSUBlabel*> . Note in particular how the new line 1 ensures correct program flow.

```
 10 :                          1 GOTO 10
 :                           110 REM*GOSUBFRANK*>
100 :                        120 :
110 <*GOSUBFRANK*>            :
120 :                        170 RETURN
 :                    ==>     10 :
170 RETURN                    :
180 <*ENDGOSUBFRANK*>        100 :
190 :                        190 :
 :                            :
```

OPERATION OF THE PROGRAM.

As indicated by line 936Ø, (which instructs the assembler to produce an autostart for the system tape), the program entry point is BEGINT i.e. line 8Ø8Ø. Thus to call the program from BASIC you must type SYSTEM ENTER and respond to the system prompt by / ENTER . If you wish you can add (before line 936Ø),

```
ORG    41A4H
DEFW   BEGINT
```

and then the command LINE will automatically enter LABELS. However, with a disk system and a good DOS, the statement

```
CMD"LABELS
```

will work. With standard DOS it may be necessary to have loaded LABELS earlier and enter LABELS via DEBUG and the G command (having noted the address of BEGINT when assembling.

Lines 8Ø8Ø-831Ø do some initialisation, display the menu, and branch to the selected routine (renumber, delete REM line, or full label handler).

The renumberer is the first routine, starting at line 48Ø (it is preceded by some initialisation). The renumberer scans the program three times. The first time through it checks out all line number references and warns of all missing lines (too many and they scroll off the screen!) and tests if the proposed numbering will work. The second time through it replaces the old line numbers by the new ones, and replaces the link pointers (the start of a program line consists of a link pointer followed by the line number, when the line has been put into memory). The third time through the line numbers after GOTO etc. are updated by evaluating the old number, scanning the link pointers (which have been replaced by the old numbers) till the right line has been found, getting the new number of the line, and replacing the old number after the GOTO by the new number. This is slow, but saves building a table (and besides, machine language is so fast anyway that I don't worry about the difference between 1 and 20 seconds). Finally, the ROM routine that resets the link pointers is called and the program returns to the menu.

In the first and third scans of the BASIC program the same branching routine 67Ø-89Ø is used, the jump addresses being altered as necessary for each pass. The branching routine is entered with a character from the BASIC program. The character is tested, and unless it needs special handling the branching routine is re-entered with the next character of the BASIC program.

The label handler first calls the renumberer with step 1 and first line number 2 (leaving room to insert the line 1 GOTO 2). On return to STRST2 ("structure, stage 2") some jump addresses in the branching routine are changed and the program scanned for reference labels after GOTO etc. These are replaced by the correct numbers and the line number in saved in a table for later "REM"ing. On return to STRST3 a similar scan is started to handle <*LOClabel*> instructions. This returns to STRST4 which handles the <*GOSUBlabel*> instructions. STRST5 deletes REMREM lines (which are the remains of the <*LOC and <*GOSUB lines). STRST6 inserts the line 1 GOTO 2, STRST7 calls the ROM link pointer resetting routine and STRST7 calls the renumberer with the wanted step and start.

Note that there is quite a number of ROM calls. Since ROMs vary slightly, there may be trouble with using them in other machines. However, I believe the calls used work in most (and probably work in all) TRS-80 MODEL I ROMs. If any trouble occurs, I will give MICRO-80 the relevant code.

```
7720:  F5 11 00 00 AF 18 06 F5 11 A8 7A 3E CD 32 17 78
7730:  ED 53 18 78 F1 C9 22 00 77 22 05 77 32 02 77 AF
7740:  32 03 77 21 33 78 22 90 77 21 E2 77 22 CA 77 21
7750:  41 78 22 38 78 21 5C 78 22 3F 78 2A A4 40 3E 00
7760:  32 04 77 2B 2B D7 FE 8D CA D0 77 FE 91 CA D0 77
7770:  FE CA CA B2 77 FE 95 CA B2 77 FE 9F CA B2 77 FE
7780:  93 CA A8 77 FE 22 CA 9C 77 FE 88 CA AD 77 B7 CA
7790:  00 00 D6 D6 32 0E 77 CC FD 77 18 C9 01 22 00 D7
77A0:  B9 28 C2 B8 20 F9 18 BC CD 07 1F 18 B7 CD 05 1F
77B0:  18 B2 11 64 77 32 0E 77 D5 D7 D2 FB 77 22 08 77
77C0:  CD 5A 1E 22 0A 77 22 0C 77 CD E2 77 2A 0C 77 C9
77D0:  32 0E 77 CD B9 77 2B D7 FE 2C 28 F7 FE D4 28 F7
77E0:  18 82 2A A4 40 7E 23 B6 CA 7C 79 23 4E 23 7E BA
77F0:  20 03 79 BB C8 CD EC 78 23 18 EA FE D6 C0 22 08
7800:  77 23 7E FE CF 20 16 01 D4 CF 23 7E B7 28 0E B8
7810:  20 F8 23 7E B9 20 F8 CD A8 7A 22 08 77 2A 08 77
7820:  C9 23 22 E6 40 7E 23 B6 23 7E 32 A2 40 23 7E 32
7830:  A3 40 C9 CD 21 78 F5 CD 41 78 F1 C2 65 77 C3 5C
7840:  78 CD 92 78 CD AF 78 E5 2A 05 77 ED 5B 02 77 19
7850:  22 05 77 11 F9 FF DF D2 77 79 E1 C9 2A 00 77 22
7860:  05 77 3A 5F 77 32 04 77 2A A4 40 5E 7B 23 B6 28
7870:  4B 56 D5 23 4E 23 46 CD 92 78 ED 5B 05 77 72 2B
7880:  73 2B 70 2B 71 2A 02 77 19 22 05 77 CD AF 78 E1
7890:  18 D9 23 7E 2B FE 93 CC 9B 78 C9 C5 E5 21 04 77
78A0:  3E 0A 96 47 AF 77 CD 47 78 05 20 FA E1 C1 C9 3A
78B0:  04 77 3C FE 0A 20 01 AF 32 04 77 C9 21 D1 78 22
78C0:  CA 77 21 20 78 22 38 78 21 81 7A 22 3F 78 C3 5B
78D0:  77 2A A4 40 4E 79 23 B6 CA A2 79 46 78 BA 20 04
78E0:  79 BB 28 0E CD EA 78 23 18 EA 23 23 AF 23 BE 20
78F0:  FC C9 23 5E 23 56 18 19 EB CD 9A 0A AF CD 34 10
7900:  B6 CD D9 0F 23 AF 4F 22 1E 77 23 0C BE 20 FB 79
7910:  C9 CD F8 78 32 07 77 2A 08 77 EB 2A 0A 77 AF ED
7920:  52 4D 3A 07 77 F5 91 C4 3C 79 2A 08 77 F1 EB 2A
7930:  1E 77 4F AF 47 ED B0 EB 22 0C 77 C9 4F 17 9F 47
7940:  78 B7 FA 6C 79 2A F9 40 09 E5 EB 21 9C FF 39 DF
7950:  DA BA 79 E1 ED 5B F9 40 22 F9 40 ED 4B 08 77 1A
7960:  77 2B 1B 7B B9 20 F8 7A B8 20 F4 C9 2A 0A 77 54
7970:  5D 09 44 4D C3 E5 2B 21 CA 79 18 48 21 F2 79 CD
7980:  A7 28 CD F8 78 2A 1E 77 2B CD A7 28 21 07 7A CD
7990:  A7 28 ED 5B A2 40 CD F8 78 2A 1E 77 2B CD A7 28
79A0:  AF C9 21 AD 79 22 1E 77 3E 05 C3 14 79 3C 2A 2D
79B0:  2A 3E CD A7 28 21 11 7A 18 0A 21 47 7A 18 F3 21
79C0:  63 7A 18 EE CD A7 28 C3 CC 06 4E 45 57 20 4C 49
79D0:  4E 45 20 4E 55 4D 42 45 52 20 54 4F 4F 20 4C 41
79E0:  52 47 45 20 2D 20 52 45 44 55 43 45 20 53 54 45
79F0:  50 00 4D 49 53 53 49 4E 47 20 4C 49 4E 45 20 4E
7A00:  55 4D 42 45 52 20 00 20 49 4E 20 4C 49 4E 45 20
7A10:  00 4F 4C 44 20 50 52 4F 47 52 41 4D 20 44 45 53
7A20:  54 52 4F 59 45 44 20 2D 20 52 45 2D 4C 4F 41 44
7A30:  20 49 54 20 42 45 46 4F 52 45 20 43 4F 4E 54 49
7A40:  4E 55 49 4E 47 00 0D 50 52 4F 47 52 41 4D 20 54
7A50:  4F 4F 20 42 49 47 20 54 4F 20 52 45 4E 55 4D 42
7A60:  45 52 00 4E 4F 20 45 4E 44 20 53 54 41 54 45 4D

7A70:  45 4E 54 20 46 4F 52 20 52 4F 55 54 49 4E 45 00
7A80:  0D CD F8 1A C9 21 02 00 3E 01 CD 20 77 CD 36 77
7A90:  21 A8 7A 22 29 77 21 D2 7A 22 3F 78 CD 27 77 21
7AA0:  20 78 22 CA 77 C3 5B 77 23 22 0A 77 3A 0E 77 B7
7AB0:  CA CD 7A 2A 08 77 23 AF CD 73 7C 20 41 CD 16 7F
7AC0:  CD EC 78 23 23 23 5E 23 56 CD 11 79 23 2B 22 08
7AD0:  77 C9 21 F6 7A 22 29 77 21 39 7B 22 3F 78 CD 27
7AE0:  77 3E EA 32 F4 7A C3 5B 77 23 22 0A 77 2A 08 77
7AF0:  23 23 7E FE EA C9 CD E9 7A 20 03 CD 73 7C C2 33
7B00:  7B 36 CF 2B 36 93 2B 36 93 CD EC 78 23 E5 D5 1B
7B10:  3E 93 12 EB 2B 2B 2B 2B E3 B4 CD 73 7C C2 BF 79
7B20:  3E 93 12 1B 12 EB CD EC 78 23 C1 D1 CD E2 7B 2B
7B30:  C3 CD 7A 2A 0A 77 C3 CD 7A 21 50 7B 22 29 77 21
7B40:  5D 7B 22 3F 78 CD 27 77 3E 91 32 F4 7A C3 5B 77
7B50:  CD E9 7A 20 DE 2B EB 2A A4 40 C3 0D 7B CD FE 7E
7B60:  21 23 BE 22 82 7B CD 72 7B 21 9D 7B 22 7A 7B C3
7B70:  CD 7A 2A A4 40 2B CD 21 78 CA 9D 7B 23 3E 93 BE
7B80:  20 16 23 BE 20 12 CD EC 78 23 EB 2A E6 40 44 4D
7B90:  C5 CD E5 2B E1 2B 18 DE CD EC 78 18 D9 2A A4 40
7BA0:  E5 3E 07 22 08 77 CD 3C 79 21 B4 7B D1 01 07 00
7BB0:  ED B0 18 07 01 01 01 00 8D 32 00 CD F8 1A 2A 14
7BC0:  77 3A 16 77 CD 20 77 CD 36 77 3A 13 77 B7 20 0E
7BD0:  67 6F 22 82 7B 21 DE 7B 22 7A 7B C3 72 7B CD F8
7BE0:  1A C9 E5 AF ED 52 E1 38 7B D5 CD FE 7B E3 CD 27
7BF0:  7C CD 36 7C E1 7D B9 20 E9 7C B8 20 E5 C9 F6 AF
7C00:  ED 5B A7 40 C5 F5 CD 1F 7C CD 1F 7C CD 1F 7C CD
7C10:  1F 7C F1 F5 CD 1F 7C B7 20 F8 F1 C5 D1 C1 C9 20
7C20:  01 2B 0A 12 03 13 C9 D5 1B 0B 0A 12 79 BD 20 F8
7C30:  78 BC 20 F4 C1 C9 D5 C5 E5 EB ED 4B A7 40 F6 AF
7C40:  CD 04 7C E1 C1 D1 C9 C5 1A 02 13 03 7B BD 20 F8
7C50:  7A BC 20 F4 C5 D1 C1 C9 C5 ED 4B A7 40 F6 AF CD
7C60:  04 7C C1 C9 D5 CD FF 7B E3 CD 47 7C CD 58 7C EB
7C70:  C3 F4 7B F5 E5 2A A4 40 2B CD 21 78 28 3B 23 7E
7C80:  FE D6 20 3B 23 7E FE CF 20 35 D1 F1 F5 D5 E5 28
7C90:  06 23 7E FE 80 20 27 CD AB 7C 20 22 FE CF 20 F7
7CA0:  CD AB 7C 20 19 FE D4 20 F3 18 1D 23 7E FE 20 28
7CB0:  FA 13 1A FE 20 28 FA BE C9 E1 F1 F6 AF C9 D1 CD
7CC0:  EC 78 18 B5 7E FE D4 C9 D1 E1 E3 E1 AF C9 41 56
7CD0:  4C 41 20 43 4F 4D 50 55 54 49 4E 47 20 41 44 56
7CE0:  49 43 45 20 20 2D 20 20 42 41 53 49 43 20 2B 20
7CF0:  4C 41 42 45 4C 53 0D 54 45 4C 2E 20 28 30 33 29
7D00:  32 33 33 31 39 38 36 20 20 28 41 55 53 54 52 41
7D10:  4C 49 41 29 0D 43 4F 50 59 52 49 47 48 54 20 52
7D20:  2E 54 2E 20 57 4F 52 4C 45 59 20 4D 45 4C 42 4F
7D30:  55 52 4E 45 20 31 39 38 31 0D 0D 4D 41 4B 45 20
7D40:  53 55 52 45 20 59 4F 55 20 48 41 56 45 20 53 41
7D50:  56 45 44 20 41 20 43 4F 50 59 20 4F 46 20 59 4F
7D60:  55 52 20 50 52 4F 47 52 41 4D 2C 20 54 48 45 4E
7D70:  20 45 4E 54 45 52 3A 0D 41 2E 2E 2E 52 45 4E 55
7D80:  4D 42 45 52 20 4F 4E 4C 59 0D 42 2E 2E 2E 44 45
7D90:  4C 45 54 45 20 52 45 4D 41 52 4B 20 4C 49 4E 45
7DA0:  53 0D 43 2E 2E 2E 46 55 4C 4C 20 4C 41 42 45 4C
7DB0:  20 48 41 4E 44 4C 45 52 0D 44 2E 2E 2E 52 45 54
```

```
7DC0:  55 52 4E 20 54 4F 20 42 41 53 49 43 0D 00 45 4E
7DD0:  54 45 52 20 4E 45 57 20 4E 55 4D 42 45 52 20 46
7DE0:  4F 52 20 46 49 52 53 54 20 4C 49 4E 45 00 45 4E
7DF0:  54 45 52 20 53 54 45 50 20 46 4F 52 20 52 45 4E
7E00:  55 4D 42 45 52 45 44 20 50 52 4F 47 52 41 4D 20
7E10:  28 31 20 54 4F 20 32 35 35 29 00 52 45 4D 41 52
7E20:  4B 53 20 4F 4E 20 48 55 4E 44 52 45 44 53 20 4F
7E30:  52 20 4E 49 4E 45 54 49 45 53 20 28 48 2F 4E 29
7E40:  3F 00 CD C9 01 31 38 76 21 FF 76 36 FF 2B 36 FF
7E50:  21 45 7E E5 21 CE 7C CD A7 28 3E 01 32 13 77 CD
7E60:  93 7E F5 CD C9 01 F1 FE 44 CA CC 06 FE 42 28 1C
7E70:  FE 43 28 12 FE 41 C0 CD CA 7E 3A 16 77 2A 14 77
7E80:  CD 20 77 C3 36 77 CD CA 7E C3 85 7A AF 32 13 77
7E90:  C3 D0 7B 06 01 2A A7 40 E5 CD D9 05 E1 7E C9 57
7EA0:  52 4F 4E 47 20 46 4F 52 4D 41 54 20 2D 20 52 45
7EB0:  44 4F 0D 00 21 9F 7E CD A7 28 CD B3 1B 38 F5 D7
7EC0:  B7 28 F1 CD 5A 1E B7 20 EB C9 21 CE 7D CD B7 7E
7ED0:  ED 53 14 77 21 EE 7D CD B7 7E AF BA 20 F6 83 28
7EE0:  F3 32 16 77 21 1B 7E CD A7 28 CD 93 7E FE 48 28
7EF0:  0A FE 4E 20 EF 3E 01 32 5F 77 C9 AF 18 F9 21 00
7F00:  77 2B 7E 2B FE FF 20 02 BE C8 57 5E E5 CD E2 77
7F10:  23 36 93 E1 18 EB E5 D5 2A A2 40 EB 21 00 77 2B
7F20:  7E 2B FE FF 20 1B BE 20 18 23 72 2B 73 2B 36 FF
7F30:  2B 36 FF 11 3B 76 DF 38 03 E1 D1 C9 23 23 23 18
7F40:  ED BA 20 DB 7E BB 20 D7 18 EF
```

***** POLYNOMIAL REGRESSION ANALYSIS L2/16K - by J.R. Jones *****

Polynomial Regression analysis is used to test data for a non-linear or curvilinear relationship between the dependent variable (Y) and the independent variable (X), according to the model $Y=A+BX+CX^2+DX^3+....ETC$. This routine allows polynomial regression analysis to the models :

$$Y = A + BX$$
$$Y = A + BX + CX^2$$
$$Y = A + BX + CX^2 + DX^3$$

on up to 100 data pairs, which are verified and can be edited following entry. The routine calculates coefficients for selected polynomial models, the mean values of X and Y and R^2 (an indication of closeness of fit, where 1 is perfect). The routine will also print residual tables on command and compute values of Y for entered values of X.

```
10 'ROUTINE FOR POLYNOMIAL REGRESSION ANALYSIS
20 '(C) COPYRIGHT 1980
30 'T.R.JONES,
40 '43 HASTIE ST.,
50 'TATURA,    3616.
60 CLS:DEFINTI-N:DIMX(100),Y(100),Q(5,5),R(5),S(5):
  P$="##########.####":D$(1)="1ST DEGREE":D$(2)="2ND DEGREE":
  D$(3)="3RD DEGREE"
70 GOSUB80:GOTO110
80 CLS:PRINTTAB(17)"POLYNOMIAL REGRESSION ANALYSIS":
  PRINTTAB(17)STRING$(30,45):NT=0
90 PRINT:PRINT:PRINT:PRINTTAB(23)"POLYNOMIAL MODELS":PRINT
100 PRINTTAB(10)D$(1);"  :  Y = A + BX                    (1)":
   PRINTTAB(10)D$(2);"  :  Y = A + BX + CX[2           (2)":
   PRINTTAB(10)D$(3);"  :  Y = A + BX + CX[2 + DX[3    (3)":
   RETURN
110 PRINT@977,"TYPE <ENTER> TO CONTINUE ...";:INPUTI$
120 CLS:PRINTTAB(27)"ENTER DATA":PRINT:PRINT:
   PRINTTAB(13)"NUMBER OF DATA POINTS - MAXIMUM IS 100"
130 PRINTTAB(28)"*";:INPUTND:IFND<2ORND>100
   PRINTCHR$(27);CHR$(30);CHR$(29);CHR$(27):GOTO130
140 PRINT:PRINT:FORI=1TOND:PRINT"X(";I;") =";:INPUTX(I):
   PRINTTAB(32)CHR$(27);"Y(";I;") =";:INPUTY(I):NEXTI
150 CLS:K=0:PRINTTAB(24)"DATA ENTERED":PRINT:FORI=1TOND:K=K+1:
   PRINT"X(";I;") =";X(I);TAB(32)"Y(";I;") =";Y(I):
   IFK<10NEXTIELSEPRINT@977,"TYPE <ENTER> TO CONTINUE ....";:
   INPUTI$:K=0:CLS:NEXTI
160 PRINT@983,"EDIT DATA (Y/N)";
170 I$=INKEY$:IFI$=""THEN170ELSEIFI$="Y"THEN180ELSEIFI$="N"
   THEN190ELSE170
```

```
180 CLS:K=0:INPUT"DATA POINT TO BE EDITED";I:
   IFI>NDTHEN180ELSEPRINTTAB(4)"X(";I;") =";X(I);TAB(36)"Y(";I;"
)    =";Y(I):
   PRINT"NEW X(";I;") =";:INPUTX(I):
   PRINTTAB(32)CHR$(27);"NEW Y(";I;") =";:INPUTY(I):GOTO150
190 GOSUB80:PRINT@856,"SELECT MODEL"
200 PRINTTAB(28)"*";:INPUTNL:IFNL<1ORNL>3
   PRINTCHR$(27);CHR$(30);CHR$(29);CHR$(27):GOTO200
210 CLS:PRINT@473,"COMPUTING ....":N=0
220 XM=0:YM=0:FORI=1TOND:XM=XM+X(I):YM=YM+Y(I):NEXTI:
   XM=XM/ND:YM=YM/ND
230 N=N+1:N1=N+1:N2=N+2
240 FORJ=1TO5:R(J)=0:S(J)=0:FORK=1TO5:Q(J,K)=0:NEXTK,J
250 FORI=1TOND:X1=X(I):Y1=Y(I):FORJ=1TON1:FORK=1TON2:
   IFK<=N1THEN270ELSE260
260 Q(J,K)=Q(J,K)+(X1[(J-1))*Y1:GOTO280
270 Q(J,K)=Q(J,K)+(X1[(J-1))*(X1[(K-1))
280 NEXTK,J,I:I=-1
290 FORK=1TON1:R(K)=K:NEXTK
300 R1=1E-9
310 FORJ=1TON1:FORK=1TON1:IFR(J)=0THEN350ELSE320
320 Z1=ABS(Q(J,K)):Z2=ABS(R1)
330 IFZ1<Z2THEN350ELSE340
340 R1=Q(J,K):J1=J:K1=K
350 NEXTK,J
360 R(J1)=0:FORK=1TON2:Q(J1,K)=Q(J1,K)/R1:NEXTK
370 FORJ=1TON1:IFJ=J1THEN390ELSE380
380 D=Q(J,K1):FORK=1TON2:Q(J,K)=Q(J,K)-Q(J1,K)*D:NEXTK
390 NEXTJ:I=I+1:IFI=NTHEN400ELSE300
400 FORJ=1TON1:FORK=1TON1:Z1=ABS(Q(J,K))
410 IFZ1<=1E-9THEN420ELSES(K)=Q(J,N2)
420 NEXTK,J
430 IFN<NLTHEN230ELSE440
440 Y3=0:Y4=0:Y5=0:FORJ=1TOND:X1=X(J):Y1=Y(J):Y2=0
450 FORK=1TON1:Y2=Y2+S(K)*(X1[(K-1)):NEXTK
460 Y3=Y3+(Y2-YM)[2:Y4=Y4+(Y1-YM)[2:Y5=Y5+(Y2-Y1)[2:NEXTJ
470 RR=Y3/Y4
480 CLS:PRINTTAB(23)D$(NL);" POLYNOMIAL":PRINT:
   PRINT"THE EQUATION FOR THE REGRESSION LINE IS :"
490 PRINT:PRINT"YHAT = ";
500 ONNGOSUB520,550,590
510 GOTO640
520 IFS(1)<0PRINT"-";ABS(S(1));ELSEPRINTS(1);
530 IFS(2)<0PRINT"-";ABS(S(2));"X";ELSEPRINT"+";S(2);"X";
540 RETURN
550 IFS(1)<0PRINT"-";ABS(S(1));ELSEPRINTS(1);
560 IFS(2)<0PRINT"-";ABS(S(2));"X";ELSEPRINT"+";S(2);"X";
570 IFS(3)<0PRINT" -";ABS(S(3));"X[2";ELSEPRINT" +";S(3);"X[2";
580 RETURN
590 IFS(1)<0PRINT"-";ABS(S(1));ELSEPRINTS(1);
600 IFS(2)<0PRINT"-";ABS(S(2));"X";ELSEPRINT"+";S(2);"X";
610 IFS(3)<0PRINT" -";ABS(S(3));"X[2";ELSEPRINT" +";S(3);"X[2";
620 IFS(4)<0PRINT" -";ABS(S(4));"X[3";ELSEPRINT" +";S(4);"X[3";
630 RETURN
640 PRINT:PRINT:PRINT"MEAN X =";XM:PRINT"MEAN Y =";YM
650 PRINT:PRINT"R SQUARE =";RR
660 PRINT@968,"SELECT NEW MODEL (M) / PRINT RESIDUAL TABLE (T)";
670 I$=INKEY$:IFI$=""THEN670ELSEIFI$="M"THEN190ELSEIFI$="T"
   THEN680ELSE670
680 CLS:J=0
690 FORI=1TOND:X1=X(I):Y1=Y(I):
   YH=S(1)+S(2)*X1+S(3)*(X1[2)+S(4)*(X1[3):RS=YH-Y1
700 IFJ=0GOSUB810
710 PRINTUSING"##";I;:PRINTUSINGP$;X1;Y1;YH;RS
720 J=J+1:IFJ=>10THEN730ELSE740
730 PRINT@977,"TYPE <ENTER> TO CONTINUE ...";:INPUTI$:J=0:CLS
740 NEXTI
750 PRINT:PRINT"SUM OF SQUARES OF DEVIATION FROM REGRESSION =";
   Y5
760 PRINT@968,"SELECT NEW MODEL (M) / ESTIMATE VALUES OF Y (E)";
770 I$=INKEY$:IFI$=""THEN770ELSEIFI$="M"THEN190ELSEIFI$="E"
   THEN780ELSE770
780 CLS:PRINT"TO EXIT SELECT NEW MODEL (M)":PRINT
790 INPUT"X =";X$:IFX$="M"THEN190ELSEX1=VAL(X$):
   YH=S(1)+S(2)*X1+S(3)*(X1[2)+S(4)*(X1[3)
800 PRINTTAB(20)CHR$(27);"Y(";N;") =";YH:GOTO790
810 PRINT"POINT";TAB(11)"X";TAB(25)"Y";TAB(38)"YHAT";
   TAB(52)"RES":PRINT:RETURN
```

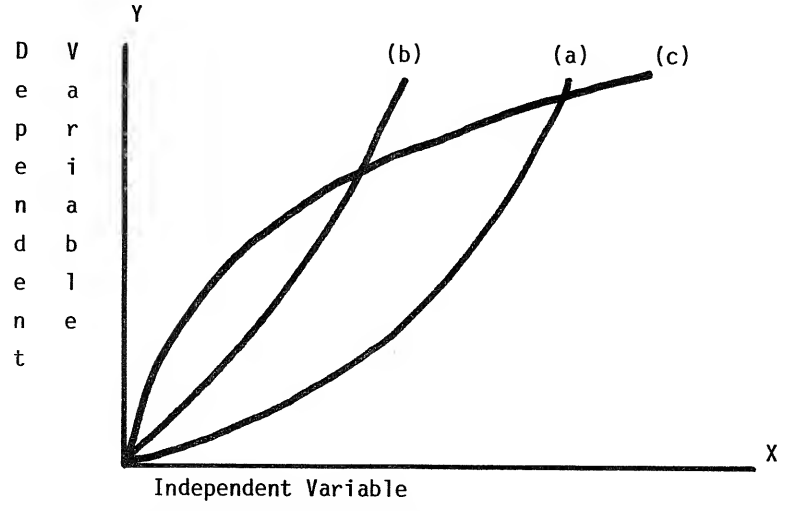
CURVILINEAR REGRESSION ANALYSIS

Curvilinear Regression analysis is used to test data for non-linear or curvilinear relationship between the dependent variable (Y), and the independent variable (X). This routine allows regression analysis for the curvilinear models :

$$Y = A * E\uparrow(BX)$$
$$Y = A + B\ LN(X)$$
$$Y = A * X(\uparrow B)$$

using up to 100 data pairs, which are verified and can be edited following entry. The routine calculates coefficients for selected curvilinear models, the mean values of X and Y, and R^2 (an indication of closesness of fit, where 1 is perfect). The routine also prints residual tables on command and computes values of Y for entered values of X.

Curvilinear Regression.



The Mathematical models for these lines are:

(a) Exponential : $Y = A*C\uparrow(BX)$

(b) Power : $Y = A*XB$

(c) Logarithmic : $Y = A+B(X)$

where A and B are specific equation coefficients for calculated relationships.

```
10 'ROUTINE FOR CURVILINEAR REGRESSION ANALYSIS
20 '(C) COPYRIGHT 1980
30 'T.R.JONES,
40 '43 HASTIE ST.,
50 'TATURA,    3616
60 CLS:DIMX(100),Y(100):P$="##########.####":D$(1)="EXPONENTIAL":
  D$(2)="LOGARITHMIC":D$(3)="POWER":E$(1)="Y'S":E$(2)="X'S":
  E$(3)="X'S OR Y'S"
70 GOSUB80:GOTO110
80 CLS:PRINTTAB(16)"CURVILINEAR REGRESSION ANALYSIS":
  PRINTTAB(16)STRING$(31,45)
90 PRINT:PRINT:PRINT:PRINTTAB(22)"CURVILINEAR MODELS":PRINT
100 PRINTTAB(10)D$(1);"    :  Y = A * E[(BX)          (1)":
   PRINTTAB(10)D$(2);"    :  Y = A + B LN(X)         (2)":
   PRINTTAB(10)D$(3);"          :  Y = A * X[(B)           (3)":
   RETURN
110 PRINT@977,"TYPE <ENTER> TO CONTINUE ...";:INPUTI$
120 CLS:PRINTTAB(26)"ENTER DATA":PRINT:PRINT:
   PRINTTAB(13)"NUMBER OF DATA POINTS - MAXIMUM IS 100"
130 PRINTTAB(28)"*";:INPUTND:IFND<2ORND>100
   PRINTCHR$(27);CHR$(30);CHR$(29);CHR$(27):GOTO130
140 PRINT:PRINT:FORI=1TOND:PRINT"X(";I;") =";:INPUTX(I):
   PRINTTAB(32)CHR$(27);"Y(";I;") =";:INPUTY(I):NEXTI
150 CLS:K=0:PRINTTAB(25)"DATA ENTERED":PRINT:FORI=1TOND:K=K+1:
   PRINT"X(";I;") =";X(I);TAB(32)"Y(";I;") =";Y(I):
   IFK<10NEXTIELSEPRINT@977,"TYPE <ENTER> TO CONTINUE ....";:
   INPUTI$:K=0:CLS:NEXTI
```

```
160 PRINT@983,"EDIT DATA (Y/N)";
170 I$=INKEY$:IFI$=""THEN170ELSEIFI$="Y"THEN180ELSEIFI$="N"
   THEN190ELSE170
180 CLS:K=0:INPUT"DATA POINT TO BE EDITED";I:
   IFI>NDTHEN180ELSEPRINTTAB(4)"X(";I;") =";X(I);TAB(36)"Y(";I;"
) =";Y(I):
   PRINT"NEW X(";I;") =";:INPUTX(I):
   PRINTTAB(32)CHR$(27);"NEW Y(";I;") =";:INPUTY(I):GOTO150
190 GOSUB80:PRINT@856,"SELECT MODEL"
200 PRINTTAB(28)"*";:INPUTNL:IFNL<1ORNL>3
   PRINTCHR$(27);CHR$(30);CHR$(29);CHR$(27):GOTO200
210 CLS:PRINT@473,"COMPUTING ....":
220 XM=0:YM=0:FORI=1TOND:XM=XM+X(I):YM=YM+Y(I):NEXTI:
   XM=XM/ND:YM=YM/ND
230 ONNLGOTO240,350,460
240 'EXPONENTIAL CURVE FIT
250 FORI=1TOND:IFY(I)<=0THEN570ELSENEXTI
260 X2=0:X3=0:X4=0:Y2=0:Y3=0:Y4=0:FORI=1TOND:
   X2=X2+X(I):X3=X3+(X(I)[2):X4=X4+(X(I)*LOG(Y(I))):
   Y2=Y2+Y(I):Y3=Y3+LOG(Y(I)):Y4=Y4+(LOG(Y(I))[2):NEXTI
270 B1=X4-(X2*Y3)/ND:B2=X3-(X2[2)/ND:B=B1/B2
280 A1=Y3/ND:A2=B*(X2/ND):A=EXP(A1-A2)
290 R1=Y4-(Y3[2)/ND:R=B1[2/(B2*R1)
300 CLS:PRINTTAB(23)D$(1);" CURVE":PRINT:
   PRINT"THE EQUATION FOR THE REGRESSION LINE IS:"
310 PRINT:PRINT"YHAT =";A;"EXP(";B;"X )"
320 PRINT:PRINT"MEAN X =";XM:PRINT"MEAN Y =";YM
330 PRINT:PRINT"R SQUARE =";R
340 GOTO590
350 'LOGARITHMIC CURVE FIT
360 FORI=1TOND:IFX(I)<=0THEN570ELSENEXTI
370 X2=0:X3=0:X4=0:Y2=0:Y3=0:Y4=0:FORI=1TOND:
   X2=X2+X(I):X3=X3+LOG(X(I)):X4=X4+(LOG(X(I))[2):
   Y2=Y2+Y(I):Y3=Y3+(Y(I)[2):Y4=Y4+(Y(I)*LOG(X(I))):NEXTI
380 B1=Y4-(X3*Y2)/ND:B2=X4-(X3[2)/ND:B=B1/B2
390 A=(Y2-(B*X3))/ND
400 R1=Y3-(Y2[2/ND):R=B1[2/(B2*R1)
410 CLS:PRINTTAB(23)D$(2);" CURVE":PRINT:
   PRINT"THE EQUATION FOR THE REGRESSION LINE IS :"
420 PRINT:IFB<0PRINT"YHAT =";A;"-";B;"LOG(X)"
   ELSEPRINT"YHAT =";A;"+";B;"LOG(X)"
430 PRINT:PRINT"MEAN X =";XM:PRINT"MEAN Y =";YM
440 PRINT:PRINT"R SQUARE =";R
450 GOTO590
460 'POWER CURVE FIT
470 FORI=1TOND:IFY(I)<=0ORX(I)<=0THEN570ELSENEXTI
480 X2=0:X3=0:X4=0:Y2=0:Y3=0:FORI=1TOND:
   X2=X2+LOG(X(I)):X3=X3+(LOG(X(I))[2):
   X4=X4+(LOG(X(I))*LOG(Y(I))):Y2=Y2+LOG(Y(I)):
   Y3=Y3+(LOG(Y(I))*LOG(Y(I))):NEXTI
490 B1=X4-(X2*Y2)/ND:B2=X3-(X2[2)/ND:B=B1/B2
500 A1=Y2/ND:A2=B*(X2/ND):A=EXP(A1-A2)
510 R1=Y3-(Y2[2)/ND:R=B1[2/(B2*R1)
520 CLS:PRINTTAB(26)D$(3);" CURVE":PRINT:
   PRINT"THE EQUATION FOR THE REGRESSION LINE IS :"
530 PRINT:PRINT"YHAT =";A;"X[";B
540 PRINT:PRINT"MEAN X =";XM:PRINT"MEAN Y =";YM
550 PRINT:PRINT"R SQUARE =";R
560 GOTO590
570 CLS:PRINT@388,"CANNOT TAKE LOGARITHMS OF NEGATIVE AND/OR ";
    "ZERO ";E$(NL)
580 PRINT@832,:END
590 PRINT@968,"SELECT NEW MODEL (M) / PRINT RESIDUAL TABLE (T)";
600 I$=INKEY$:IFI$=""THEN600ELSEIFI$="M"THEN190ELSEIFI$="T"
   THEN610ELSE600
610 CLS:J=0:SS=0:FORI=1TOND:X1=X(I):Y1=Y(I):
   ONNLGOSUB740,750,760:RS=YH-Y1:SS=SS+(RS[2)
620 IFJ=0GOSUB770
630 PRINTUSING"##";I;:PRINTUSINGP$;X1;Y1;YH;RS
640 J=J+1:IFJ=>10THEN650ELSE660
650 PRINT@977,"TYPE <ENTER> TO CONTINUE ....";:INPUTI$:J=0:CLS
660 NEXTI
670 PRINT:PRINT"SUM OF SQUARES OF DEVIATION FROM REGRESSION =";S
S
680 PRINT@968,"SELECT NEW MODEL (M) / ESTIMATE VALUES OF Y (E)";
690 I$=INKEY$:IFI$=""THEN690ELSEIFI$="M"THEN190ELSEIFI$="E"
   THEN700ELSE690
```

```
700 CLS:PRINT"TO EXIT SELECT NEW MODEL (M)":PRINT
710 INPUT"X =";X$:IFX$="M"THEN190ELSEX1=VAL(X$)
720 ONNLGOSUB740,750,760
730 PRINTTAB(20)CHR$(27);"YHAT =";YH:GOTO710
740 YH=A*EXP(B*X1):RETURN
750 YH=A+B*LOG(X1):RETURN
760 YH=A*(X1[B):RETURN
770 PRINT"POINT";TAB(11)"X";TAB(25)"Y";TAB(38)"YHAT";
   TAB(52)"RES":PRINT:RETURN
```

***** STEEPLE CHASE LII/16K - by C. Cranstone *****

Welcome to steeple chase! The grand old DUKE OF NAGSVILLE has invited you and your associates to a steeple chase in his honour.

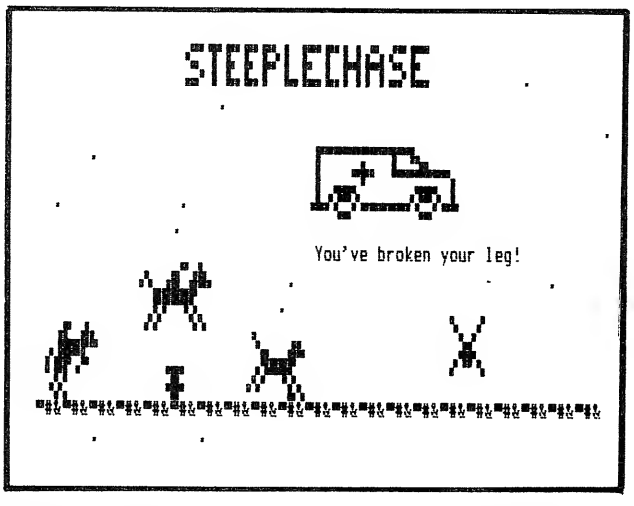
Due to an old war wound the Duke cannot participate. The Duke will be watching and making various comments on your expertise. (Or lack of!!!)

If you ride very badly then you risk the chance of a broken leg. (Or two!!) If you do manage to break a leg you will be taken away in the ambulance.

Press the 'S' key to start the ride.
Press the 'J' key to jump.

The winner and scores will be displayed at the end of the day.

The program also includes sound which can be heard through the external cassette deck. The sound routine is POKEd into line 1Ø after the REM. If you are typing this program in from the magazine, you should fill the rest of line 1Ø with blanks, otherwise an error will result.




```
10 GOTO20:REM ** STEEPLE/BAS **  (C) 1981  C. CRANSTONE
  N.B. LINE 160: B$="7 SPACES:DOWN ARROW:7 SPACES:DOWN ARROW:7SPA
CES"

20 CLS:TT=PEEK(16549)*256+PEEK(16548):TA=TT+59:M=TT+10
30 M1=INT(M/256):M2=INT(M-M1*256):FORL=MTOM+47:READZ:POKEL,Z:NEX
T:IFTT<>17129ANDTT<>17385THENDEFUSR0=MELSEPOKE16526,M2:POKE16527,
M1
40 DATA205,127,10,229,221,225,221,78,0,121,183,200,221,70,1,62,5
,211,255,16,254,221,70,1,62,6,211,255,16,254,13,32,235,221,35,221
,35,1,255,255,33,48,0,9,56,253,24,214
50 TA=PEEK(16549)*256+PEEK(16548)+59:POKETA,100:POKETA+1,100:POK
ETA+2,0:X=USR(TA)
60 REM**STEEPLE/BAS : C. CRANSTONE AUG.1981 (C)
70 CLEAR100
80 CLS:PRINTCHR$(23):PRINT:PRINT:PRINTSTRING$(31,176):CLEAR2000:
DEFSTRH,G,J:J8=STRING$(64,32):MN$=CHR$(23)+"S t e e p l e c h a s
 e

B y  C . C r a n s t o n e

( C )  1 9 8 1 .":FORK=1TOLEN(MN$):PRINTMID$(MN$,K,1);:FORP=1TO0
5:NEXTP:NEXTK:FORO=1TO700:NEXTO
```

```
90 FORT=1TO48:READS:NEXTT:CV=32
100 IU$="                                    **Steeplechase** - **Wr
itten by C. Cranstone (C) 1981** - **Press 'I' for instructions o
r 'ENTER' for game** "
110 GOSUB1590
120 CLS:TA=PEEK(16549)*256+PEEK(16548)+59:FORK=1TO50:PRINT@RND(8
59),".";:NEXTK:PRINT@272,SC$;:PRINT@595,EM$;
130 CV=CV+1:IFCV>=LEN(IU$)THENCV=0ELSEPRINT@395,MID$(IU$,CV,37);
:POKETA,10:POKETA+1,10:POKETA+2,0:X=USR(TA):FORU=1TO5:NEXTU
140 IFPEEK(15358)=0THEN130ELSEWQ=PEEK(15358):IFWQ=2THEN1440ELSEI
FWQ=1THEN150ELSE130
150 '
160 B$="

      "
170 C$="      "+CHR$(27)+STRING$(5,24)+"      "
180 TA=PEEK(16549)*256+PEEK(16548)+59
190 PP$(1)="first":PP$(2)="second":PP$(3)="third":PP$(4)="fourth
":PP$(5)="fifth":PP$(6)="sixth"
200 K$=INKEY$:IFK$=""THEN200
210 CLS:PRINT:PRINT"How many riders are there";CHR$(95);
220 H8=H8+CHR$(27)+CHR$(27)+"    "+CHR$(26)+CHR$(26)
230 K$=INKEY$:IFK$=""THENPRINTCHR$(8);CHR$(143);:GOTO230ELSEK=VA
L(K$)
240 IFK<=0ORK>6THENPRINT"Bad input":FORO=1TO300:NEXTO:GOTO210ELS
EPRINTCHR$(8);K
250 NP=K
260 V=0:TA=PEEK(16549)*256+PEEK(16548)+59:POKETA,100:POKETA+1,13
0:POKETA+2,0:X=USR(TA)
270 FORX1=1TONP:PRINT"Player number "X1", enter your name ";:INP
UTNA$(X1):NEXTX1
280 '
290 QW=826:V=V+1:IFV>NPTHEN1070ELSECLS:FORK=1TO45:PRINT@RND(767)
,".";:NEXTK
300 PRINT@15,SC$
310 IFNT(V)>=10THEN280
320 PRINT@192,"Will the "PP$(V)" rider please mount.":NT(V)=NT(V
)+1:IFNT(V)>=10THENPRINT@256,"Last ride ";NA$(V);"!";
330 PRINT@650,"            ";
340 GOTO470
350 '
360 PRINT@896,"Press 'S' when ready to start please ";NA$(V)
370 IFINKEY$<>"S"THEN370ELSEPRINT@320,"Ride number ";NT(V);
380 PRINT@896," .   .          .                .
                  . ";:PRINT@192,"                                .
     ";:PRINT@256," .                          .    ";
390 POKETA,100:POKETA+1,50:POKETA+2,0:X=USR(TA)
400 GOSUB600
410 RANDOM
420 GOSUB490
430 IFINKEY$="J"THENGOSUB680
440 PRINT@896," .   .          .                .
                ";
450 POKETA,5:POKETA+1,100:POKETA+2,4:POKETA+3,254:POKETA+4,0:X=U
SR(TA)
460 PRINT@832,J9;:PRINT@833,LEFT$(J9,LEN(J9)-1):GOTO420
470 PO=PO+1:IFPO=1THENPRINT@640,B$;:PRINT@832,J9;:PRINT@640,H4;E
LSEIFPO=2THENPRINT@640,B$;:PRINT@832,J9;:PRINT@640,H5;ELSEIFPO>=3
THENPO=0:PRINT@640,B$;:PRINT@832,J9;:PRINT@640,H6;
480 POKETA,100:POKETA+1,16:POKETA+2,0:X=USR(TA):FORP=1TO150:NEXT
P:AS=AS+1:IFAS=>6THENAS=0:GOTO350ELSE470
490 'MOVE
500 PRINT@QW,JU$;:PP=PP+1:IFPP=1THENPRINT@640,B$;:PRINT@640,H2;E
LSEIFPP=2THENPRINT@640,B$;:PRINT@640,H1;ELSEIFPP=3THENPRINT@640,B
$;:PRINT@640,H3;ELSEIFPP>=4THENPP=0:PRINT@640,B$;:PRINT@640,H1;
510 PRINT@QW,C$;:QW=QW-RND(3):IFQW<774THENIP=QW:PRINT@650,"Nay!
Ouch!";:QW=0:PRINT@640,H1;:GOTO690ELSEPRINT@QW,JU$;
520 RETURN
530 POKETA,100:POKETA+1,20:POKETA+2,0:X=USR(TA):PRINT@QW,C$;:QW=
QW-RND(3):IFQW<=775THENQW=775:RETURNELSEPRINT@QW,JU$;
540 PRINT@832,J9;:PRINT@833,LEFT$(J9,LEN(J9)-1):RETURN
550 POKETA,45:POKETA+1,60:POKETA+2,0:X=USR(TA):ONRND(4)GOTO560,5
70,580,590
560 PRINT@256,"Go see an optician!";:RETURN
570 PRINT@256,"You jumped too early!";:RETURN
580 PRINT@256,"Do they let you out on weekends?";:RETURN
590 PRINT@256,"Whats the matter? Got a nervous twitch or somethi
ng?";:RETURN
```

```
600 'PICK JUMP
610 POKETA,34:POKETA+1,52:POKETA+2,0:X=USR(TA):ONRND(6)GOTO620,6
30,640,650,660,670
620 JU$=J1:RETURN
630 JU$=J2:RETURN
640 JU$=J3:RETURN
650 JU$=J4:QW=821:RETURN
660 JU$=J5:RETURN
670 JU$=J6:RETURN
680 IP=QW:PRINT@640,B$;:PRINT@641,H7;:GOSUB530:PRINT@641,B$;:PRI
NT@512,H9;:GOSUB530:PRINT@452,B$;:PRINT@512,H9;:GOSUB530:PRINT@45
2,B$;:PRINT@640,H8;:GOSUB530:FORO=1TO150:NEXTO:PRINT@640,B$;:PRIN
T@640,H1;:GOSUB1000
690 QW=826:IFIP<=774THENGOSUB1320:PRINT@192,"Bad jump!":GOSUB770
:GOSUB760:GOTO740
700 QW=826:IFIP=776THENPRINT@192,"Fair jump! 2 points!":GOSUB830
:GOSUB760:SC(V)=SC(V)+2:GOTO740
710 QW=826:IFIP=777THENPRINT@192,"Poor jump! 1 point!":GOSUB880:
GOSUB760:SC(V)=SC(V)+1:GOTO740
720 QW=826:IFIP=775THENPRINT@192,"Good jump by jove!":GOSUB940:G
OSUB760:SC(V)=SC(V)+3:GOTO740
730 QW=826:IFIP>=776THENPRINT@192,"You need glasses!!":GOSUB550:
GOSUB760:SC(V)=SC(V)-1:GOTO740
740 IFNT(V)>=10THEN290ELSE320
750 RETURN
760 FORTY=0TO500:NEXTTY:RETURN
770 POKETA,76:POKETA+1,76:POKETA+2,0:X=USR(TA):ONRND(4)GOTO780,7
90,800,810
780 PRINT@256,"Are you riding a horse or a corgi?";:RETURN
790 PRINT@256,"Constructive comment: take up a new hobby!";:RETU
RN
800 PRINT@256,"Are you sure you can ride a horse?";:RETURN
810 PRINT@256,"Whats the matter! have you got a loose saddle?";:
RETURN
820 RETURN
830 POKETA,RND(255):POKETA+1,45:POKETA+2,0:X=USR(TA):ONRND(3)GOT
0840,850,860
840 PRINT@256,"A bit more effort and you'll make it over easier!
";:RETURN
850 PRINT@256,"Pretty good, but not excellent!";:RETURN
860 PRINT@256,"At least your trying! keep up the standard!";:RET
URN
870 RETURN
880 POKETA,RND(255):POKETA+1,43:POKETA+2,0:X=USR(TA):ONRND(4)GOT
0890,900,910,920
890 PRINT@256,"Only 1 point! Now try for more!";:RETURN
900 PRINT@256,"A corgi could do better!!";:RETURN
910 PRINT@256,"Shape up or ship out!!!!";:RETURN
920 PRINT@256,"A bit weak!  Come on, you can do better than that
!";:RETURN
930 RETURN
940 POKETA,111:POKETA+1,90:POKETA+2,0:X=USR(TA):ONRND(4)GOTO950,
960,970,980
950 PRINT@256,"I say, well done old chap!";:RETURN
960 PRINT@256,"Brilliant! Absolutely brilliant!";:RETURN
970 PRINT@256,"Awwwfully good! Well done I say!";:RETURN
980 PRINT@256,"What a jump! Wonnnderful! (Chorkle chorkle!)";:RE
TURN
990 RETURN
1000 IFIP=777ANDJU$=J4THENSC(V)=SC(V)-1:PRINT@448,"Your horse hi
t water! lose the point!";:FORO=1TO400:NEXTO:PRINT@448,"     .
 .   .     .   .   .     .";:RETURN
1010 IFIP=777ANDJU$=J6THENSC(V)=SC(V)-1:PRINT@448,"Your horse la
nded in the mud! Lose the point!";:FORO=1TO400:NEXTO:PRINT@448,"
   .   .     .   .   .   .   .   .     . ";:RETURN
1020 POKETA,50:POKETA+1,75:POKETA+2,0:X=USR(TA):RETURNELSERETURN
1030 PRINT"** Winners **"
1040 FORT=1TONP:IFWI$(T)="Y"THENPOKETA,20:POKETA+1,20:POKETA+2,0
:X=USR(TA):PRINTNA$(T):NEXTTELSENEXTT
1050 FORT=1TONP:IFWI$(T)="Y"THEN1060ELSEPRINT"DRAW! NO WINNER!"
1060 RETURN
1070 '
1080 CLS:PRINT@15,SC$;
1090 PRINT:PRINTSTRING$(64,176)
1100 FORT=1TONP:PRINTCHR$(143);" ";NA$(T);STRING$(20-LEN(NA$(T))
,32);"scored ";SC(T):NEXTT
1110 IFNP>=1THEN IFSC(1)>SC(2)ANDSC(1)>SC(3)ANDSC(1)>SC(4)ANDSC(
1)>SC(5)ANDSC(1)>SC(6)THENWI$(1)="Y"
```

```
1120 IFNP>=2THENIFSC(2)>SC(1)ANDSC(2)>SC(3)ANDSC(2)>SC(4)ANDSC(2
)>SC(5)ANDSC(2)>SC(6)THENWI$(2)="Y"
1130 IFNP>=3THENIFSC(3)>SC(1)ANDSC(3)>SC(2)ANDSC(3)>SC(4)ANDSC(3
)>SC(5)ANDSC(3)>SC(6)THENWI$(3)="Y"
1140 IFNP>=4THENIFSC(4)>SC(1)ANDSC(4)>SC(2)ANDSC(4)>SC(3)ANDSC(4
)>SC(5)ANDSC(4)>SC(6)THENWI$(4)="Y"
1150 IFNP>=5THENIFSC(5)>SC(1)ANDSC(5)>SC(2)ANDSC(5)>SC(3)ANDSC(5
)>SC(4)ANDSC(5)>SC(6)THENWI$(5)="Y"
1160 IFNP>=6THENIFSC(6)>SC(1)ANDSC(6)>SC(2)ANDSC(6)>SC(3)ANDSC(6
)>SC(4)ANDSC(6)>SC(5)THENWI$(6)="Y"
1170 PRINTSTRING$(64,131):GOSUB1030:FORT=1TO3000:NEXTT:CLS:PRINT
@15,SC$;
1180 PRINT:PRINT"Another game? ";
1190 PRINTCHR$(143);CHR$(8);:POKETA,187:POKETA+1,9:POKETA+2,0:X=
USR(TA)
1200 IFPEEK(15359)=0THEN1190ELSEK=PEEK(15359)
1210 POKETA,100:POKETA+1,100:POKETA+2,0:X=USR(TA)
1220 IFK=2THENRUN
1230 DEFSTRC:C=CHR$(143):CLS:PRINT@0,STRING$(64,143);:PRINT:PRIN
T
1240 PRINT@64,C;:FORT=2TO14:PRINT@T*64-1,C;C;:NEXTT:PRINT@79,SC$
;:PRINT@270,H1;:PRINT@390,FM$;
1250 PRINT@896,STRING$(64,188);
1260 N$="
        ** 'Steeplechase' Written by C. Cranstone (C) 1981 : Ch
ristie downs, Adelaide, South Australia. : Modified for SYSTEM-80
/PMC-80/VIDEO GENIE and TRS-80 Model I a"
1270 N$=N$+"nd Model III computers ** "
1280 V=60
1290 V=V+1:IFV>=LEN(N$)THENV=0ELSEPRINT@577,MID$(N$,V,62);:POKET
A,255:POKETA+1,14:POKETA+2,0:X=USR(TA)
1300 FORT=1TO20:NEXTT
1310 GOTO1290
1320 '
1330 IFRND(3)<>2THENRETURN
1340 PRINT@640,EM$;:FORT=TATOTA+50STEP2:POKET,50:POKET+1,T-(TA-2
):NEXTT:POKETA+51,0:POKETA+52,0:X=USR(TA)
1350 PRINT@640,EM$;
1360 POKETA,120:POKETA+1,24:POKETA+2,0
1370 FORT=650TO690STEP2:PRINT@T,FM$;:PRINT@T+64+64," ";:FORO=1TO
30:NEXTO:PRINT@T,C$;:PRINT@T+1,FB$;:PRINT@T+65+64," ";:FORO=1TO30
:NEXTO:PRINT@T+1,C$;:X=USR(TA):NEXTT
1380 POKETA+16,0:PRINT@T+64,CM$;:FORT=TATOTA+15STEP2:POKET+1,200
:POKET,T-(TA-2):NEXTT:X=USR(TA)
1390 PRINT@448,"You've fallen off of your horse and broken your
leg!!";:FORU=1TO400:NEXTU:PRINT@448,CHR$(30);
1400 POKETA,13:POKETA+1,189:POKETA+2,0
1410 FORT=448TO485:PRINT@T,A1$;:FORO=1TO15:NEXTO:PRINT@T,A2$;:FO
RO=1TO15:NEXTO:PRINT@448,CHR$(30);:PRINT@512,CHR$(30);:PRINT@576,
CHR$(30);:X=USR(TA):NEXTT:PRINT@T-1,A1$;:PRINT@755,"          "+CHR
$(26)+STRING$(8,24)+"          ";:PRINT@485,A1$;
1420 FORX=1TO700:NEXTX
1430 GOTO280
1440 REM**  \\ Instructions below \\  **
1450 CLS:FORT=1TO45:PRINT@RND(896),".";:NEXTT:PRINT@79,SC$;
1460 PRINT@0,STRING$(64,143);:PRINT@896,STRING$(64,188);:PRINT@6
4,CHR$(143);:FORT=2TO14:PRINT@T*64-1,CHR$(143);CHR$(143);:NEXTT:P
RINT@959,CHR$(143);:IFVK=2THENRETURN
1470 PRINT@209,"Welcome to steeplechase!";
1480 PRINT@257,"The grand old DUKE OF NAGSVILLE has invited you
and your  . .";
1490 PRINT@321,"associates to a steeplechase in his honour.";
1500 PRINT@449,"Due to an old war wound, the Duke can not partic
ipate. . . ";
1510 PRINT@513,"The Duke will be watching and making various com
ments on your ";:PRINT@577,"expertise. (Or lack of!!!)";
1520 PRINT@641,"If you ride very badly then you risk the chance
of a broken ";:PRINT@705,"leg. (Or two!!)    If you do manage to
break a leg you will be";:PRINT@769,"taken away in the ambulance.
";
1530 PRINT@847,"Press any key to continue";
1540 IFPEEK(15359)=0THEN1540
1550 VK=2:GOSUB1440:VK=0
1560 PRINT@321,"Press the 'S' key to start the ride.";:PRINT@449
,"Press the 'J' key to jump.";:PRINT@577,"The winner & scores wil
l be displayed at the end of the day.";:PRINT@705,H1;:PRINT@847,"
Press any key to continue";
1570 IFPEEK(15359)=0THEN1570
```

```
1580 GOTO120
1590 REM
1600 DATA32,144,32,32,32,32,32,184,144,26,24,24,24,24,24,24,24,2
4,24,130,130,188,188,188,188,190,135,131,26,24,24,24,24,24,24,24,
24,24,32,168,169,129,32,130,150,180:'EM$
1610 FORT=1TO46:READA:EM$=EM$+CHR$(A):NEXT
1620 DATA136,179,129,171,129,183,129,183,129,183,153,170,32,170,
147,129,151,129,181,186,168,179,148,166,147,170,147,129,26,24,24,
24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24
,24,24,24,24,136,140,129,138,32,141,132,141,132
1630 DATA133,32,138,140,138,140,132,141,132,133,138,138,32,133,1
40,134,138,140,132:FORT=1TO85:READA:SC$=SC$+CHR$(A):NEXT
1640 DATA32,168,183,176,190,180,26,24,24,24,24,24,24,24,24,32,150,1
90,159,163,141,32,26,24,24,24,24,24,24,24,24,32,136,153,145,32,32:'H
7
1650 FORT=1TO35:READA:H7=H7+CHR$(A):NEXTT
1660 DATA32,164,32,32,32,160,144,26,24,24,24,24,24,24,24,32,160,
175,188,188,159,131,26,24,24,24,24,24,24,24,136,137,129,32,130,18
2,164:FORT=1TO37:READA:H8=H8+CHR$(A):NEXTT
1670 DATA168,191,191,191,148,27,24,24,24,24,24,32,160,176,144,32
,26:FORT=1TO17:READA:J1=J1+CHR$(A):NEXT
1680 DATA136,191,132,27,24,24,24,160,176,144,26:FORT=1TO11:READA
:J2=J2+CHR$(A):NEXT:DATA191,191,27,24,24,160,144,26:FORT=1TO8:REA
DA:J3=J3+CHR$(A):NEXT:DATA136,191,132,27,24,24,24,160,176,144,26,
32,32,32,32,32,26,24,24,24,24,24,87,97,116,101,114
1690 DATA27:FORT=1TO28:READA:J4=J4+CHR$(A):NEXT
1700 FORT=1TO21:J9=J9+CHR$(131)+CHR$(35)+CHR$(38):NEXT:DATA191,1
40,140,140,191,27,24,24,24,24,24,176,32,32,32,176,26:FORT=1TO17:R
EADA:J5=J5+CHR$(A):NEXT
1710 DATA191,191,27,24,24,160,144,26,32,32,32,26,24,24,24,77,117
,100,27:FORT=1TO19:READA:J6=J6+CHR$(A):NEXTT:DATA160,32,32,32,144
,26,24,24,24,24,24,32,137,191,134,32,26,24,24,24,24,24,160,134,32
,137,144:FORT=1TO27:READA:FM$=FM$+CHR$(A):NEXTT
1720 DATA32,144,32,32,160,26,24,24,24,24,32,130,164,152,129,2
6,24,24,24,24,24,32,152,139,135,164:FORT=1TO27:READA:FB$=FB$+CHR$
(A):NEXT:DATA32,160,164,152,144,26,24,24,24,24,24,32,153,139,135,
166:FORT=1TO16:READA:CM$=CM$+CHR$(A):NEXTT
1730 DATA32,32,32,32,32,176,32,144,26,24,24,24,24,24,24,24,24,13
6,137,176,184,191,176,190,143,132,26,24,24,24,24,24,24,24,24,24,3
2,160,167,135,131,139,153,144,26,24,24,24,24,24,24,24,24,32,129,1
29,32,32,32,130,130:FORT=1TO61:READA:H9=H9+CHR$(A)
1740 NEXT:DATA32,32,32,160,188,176,32,184,144,26,24,24,24,24,24,
24,24,24,24,160,134,188,191,191,189,190,135,131,26,24,24,24,24,24
,24,24,24,24,32,152,169,129,160,134,130,148,32:FORT=1TO47:READA:H
5=H5+CHR$(A):NEXT
1750 DATA32,144,32,160,179,176,32,184,144,26,24,24,24,24,24,24,2
4,24,24,130,130,188,188,191,189,188,159,131,129,26,24,24,24,24,24
,24,24,24,24,32,168,169,129,32,130,150,148:FORT=1TO47:READA:H6=H6
+CHR$(A):NEXT
1760 DATA32,32,151,131,131,131,131,147,131,131,171,131,139,164,1
44,32,32,32,26,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24
,24,32,32,149,32,176,176,147,135,129,32,130,131,131,179,179,147,1
31,148,26,24,24,24,24,24,24,24,24,24,24,24,24,24,24
1770 DATA24,24,24,24,32,136,141,134,166,179,134,140,140,140,140,
140,134,166,179,134,140,141:FORT=1TO92:READA:A1$=A1$+CHR$(A):NEXT
T:DATA32,32,32,160,179,176,32,184,144,26,24,24,24,24,24,24,24,24,
24,32,150,188,191,191,189,190,135,131,26,24,24,24,24,24
1780 DATA24,24,24,24,32,168,169,129,32,130,150,148,32:FORT=1TO47
:READA:H1=H1+CHR$(A):NEXT:DATA32,136,144,32,184,188,151,160,180,3
2,26,24,24,24,24,24,24,24,24,24,24,24,32,32,130,188,190,189,188,159,
131,129,26,24,24,24,24,24,24,24,24,24,24,24,32,32,32
1790 DATA137,153,144,130,166,164,32:FORT=1TO52:READA:H2=H2+CHR$(
A):NEXT:DATA32,32,32,176,179,144,160,180,32,26,24,24,24,24,24,24,
24,24,24,168,169,188,190,191,188,159,131,129,26,24,24,24,24,24,24
,24,24,24,160,166,134,160,152,153,129,32,32
1800 FORT=1TO47:READA:H3=H3+CHR$(A):NEXT:DATA32,32,32,160,179,17
6,32,160,32,26,24,24,24,24,24,24,24,24,24,168,169,188,191,191,189
,188,175,189,26,24,24,24,24,24,24,24,24,24,32,168,169,129,32,130,
150,164:FORT=1TO46:READA:H4=H4+CHR$(A):NEXT
1810 DATA32,32,151,131,131,131,131,131,131,131,171,131,139,164,1
44,32,32,32,26,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24,24
,24,32,32,149,32,176,176,144,32,32,32,130,131,131,179,179,147,131
,148,26,24,24,24,24,24,24,24,24,24,24,24,24,24
1820 DATA24,24,24,24,24,24,32,136,141,134,140,153,134,140,140,14
0,140,140,134,140,153,134,140,141:FORT=1TO92:READA:A2$=A2$+CHR$(A
):NEXT
1830 RETURN
```

***** NEXT MONTH'S ISSUE *****

Next month's issue will contain at least the following programs plus the usual features and articles.

** MEASUREMENTS LII/16K **

This program was primarily designed to help high school students with their studies. It poses problems and asks questions on the following solid figures: cube, rectangle faced prism, rhombus faced prism, triangle faced prism, parallelogram faced prism, trapesium faced prism, cylinder, pyramid cone and sphere. All of the above figures are displayed graphically before the questions are asked.

** FILES LII/48K **

Yes...it is! The files program that was requested to be modified to run in 48K. Originally published way back in issue 3, February 1980, the program had a m/l routine that had to be loaded separately - very messy!!! This version has the machine language built right into the BASIC program.

** DUPLEX LII/4K m/l **

This is a package of double precision mathematical functions including, SIN, COS, TAN, ATN, EXP, LOG and SQR. All of these functions are called quite easily from BASIC, e.g. X = USR SIN(Y)

** SUPER HANGMAN LII/16K **

Oh no! Not that again. That's what you thought when you saw the title and so did I, which just goes to prove how wrong Software Editors could be if they didn't look at EVERY program, regardless of the title. This FANTASTIC program has constantly animated graphics, plays tunes and sound effects and is Hangman like you never saw it before - don't miss it!!!

** DATA BASE MANAGEMENT SYSTEM 48K/Disk **

Next month we present this efficient Data base management system. This one program alone is worth more than your subscription AND the author has found a way to store strings so that BASIC doesn't waste time shuffling them around. Next month he reveals all.....

APPLICATION FOR PUBLICATION OF A PROGRAM IN MICRO-80

Date .....

Tick where appropriate

To **MICRO-80**

Please consider the enclosed program for ...

(i) Publication in MICRO-80 .....

(ii) Publication on disk or cassette only .....

(iii) Both .....

Name .....

Address .....

.....

.....Postcode .....

***** CHECK LIST *****

Please ensure that the cassette or disk is clearly marked with your name and address, program name(s), Memory size, Level I, II, System 1 or 2, Edtasm, System, etc. The use of REM statements with your name and address is suggested, in case the program becomes separated from the accompanying literature.

Ensure that you supply adequate instructions, notes on what the program does and how it does it, etc.

For system tapes, the start, end, and entry points, etc.

The changes or improvements that you think may improve it.

Please package securely — padabags are suggested — and enclose stamps or postage if you want your cassette or disk returned.

***** CASSETTE/DISK EDITION INDEX *****

The cassette edition of MICRO-80 contains all the software listed each month, on cassette. All cassette subscribers need do is CLOAD and RUN the programs. Level II programs are recorded on side 1 of the cassette. Level I programs are recorded on side 2. Level I programs are not compatible with the System 80. All programs are recorded twice in succession. Note, System 80 computers have had different tape-counters fitted at different times. The approximate start positions shown are correct for the very early System 80 without the volume control or level meter. They are probably incorrect for later machines. The rates for a cassette subscription are printed on the inside front cover of each issue of the magazine.

The disk edition contains all those programs which can be executed from disk, including Level I programs. Level I disk programs are saved in the NEWDOS format. Users require the Level I/CMD utility supplied with NEWDOS + or NEWDOS 80 version 1.0 to run them.

				APPROX. START POSITION		
SIDE ONE	TYPE	I.D.	DISK FILESPEC	CTR-41	CTR-80	SYSTEM-80
POLYNOMIAL REGRESSION	L2/4K	P	POLY/BAS	15	10	10
"	"	"		50	34	36
CURVILINEAR REGRESSION	L2/4K	C	CURV/BAS	85	57	60
"	"	"		119	80	84
STEEPLECHASE	L2/16K	S	STEEPLE/BAS	150	102	107
"				240	162	170
3-D MAZE	L2/16K	M	MAZE/BAS	320	215	225
SIDE TWO						
3-D MAZE	L2/16K	M		15	10	10
BASIC + LABELS	DISK/32K	LABELS	LABELS/CMD	82	55	58
"	(OBJECT)	"		104	70	73
	(EDTASM)	"	LABELS/EDT	125	84	88
TRIANGLE SOLUTIONS	L1/16K	-	TRIANGLE/LVI	270	182	-

TO:
MICRO-80, P.O. BOX 213, GOODWOOD,
SOUTH AUSTRALIA. 5034.

Please RUSH to me the items shown below:

$ enclosed Date

.....12 month subscription to MICRO-80

.....12 month subscription to MICRO-80, plus the cassette edition

.....The latest issue of MICRO-80 (see inside front cover for prices)

The MICRO-80 PRODUCTS listed below:

DESCRIPTION	PRICE

TOTAL ENCLOSED WITH ORDER

☐ Cheque ☐ Bankcard ☐ Money Order

Bankcard Account Number

Signature ..... Exp. End .....

NAME .....

ADDRESS .....

Postcode .....

A SPECIAL OFFER!

TO SUBSCRIBERS OF MICRO 80

FOR THE FIRST TIME IN AUSTRALIA!
GENUINE TANDY TRS–80 MICRO-COMPUTERS, HARDWARE AND SOFTWARE AT

GREAT DISCOUNT PRICES!!!

HOW TO ORDER –

1. SELECT ITEMS FROM 1980 TANDY CATALOGUE
2. DEDUCT 10% FROM ADVERTISED PRICES
3. POST US YOUR ORDER STATING DESCRIPTION CAT. No AND A CHEQUE OR MONEY ORDER.

WE WILL –

1. ATTEND TO YOUR ORDER WITHIN 7 DAYS *
2. SUPPLY GOODS SELECTED FREIGHT FREE !
3. SEND ADVERTISING REGULARLY TO KEEP YOU INFORMED OF CURRENT SPECIALS !

* *subject to availability*

to **CONQUEST ELECTRONICS** Pty. Ltd.
212 Katoomba St. KATOOMBA 2780

Please supply –

QTY.	CAT NO	DESC.	ADV. PRICE

SUB TOTAL
LESS 10%
FIND CHEQUE FOR **TOTAL**

SEND **FREIGHT FREE** TO

NAME .....

ADDRESS .....

.....P/ Code .....

TANDY ELECTRONICS DEALER

CONQUEST ELECTRONICS PTY. LTD.

212 KATOOMBA ST KATOOMBA N.S.W. 2780 PHONE (047) 82 2491

Tandy's TRS-80 Color Computer Adds Color And Sound To Personal Computing!

NEW to Australia! Tandy Electronics introduces the TRS-80 Color Computer.

Set to add a new and exciting dimension to the world of personal computing, the addition of colour and sound will make programmes come alive as you and your family enter a new era of the computer revolution.

Tandy's TRS-80 Color Computer is complemented by an extensive range of ready-to-run software; business, personal management, educational, and entertainment programmes that will involve every member of the family.

NOW available for immediate delivery, the TRS-80 4K Color Computer (expandable up to 32K) starts from a low $599*.

Tandy ELECTRONICS

"THE BIGGEST NAME IN LITTLE COMPUTERS"

*Available through Tandy Computer Centres, Computer Departments, and participating Tandy Dealers. *Monitor (not included)*

MICRO-80